FOOD INDUSTRIES

SEP 8 1942

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

SEPTEMBER 1942

Method for Grading A Dehydrated Food

Automatic Oiling Saves Machines

How to Conserve Labelers; Belts

Conveyors Help Retain Quality

New Data on Cold Storage Rooms

Fruit Purées Give New Flavors For Ice Cream

A McGRAW-HILL PUBLICATION

We asked grocers about DEHYDRATED FOODS

1. What do you think of the future for dehydrated foods?

2. What's the best package for dehydrated foods—box, envelope, cylinder?

3. How many dehydrated foods do you stock?

4. Which dehydrated foods sell fastest?

5. How about the price structure and profit on dehydrated foods?

6. What store promotions are used to sell dehydrated foods?

IN ORDER to be completely abreast of the times, The Evening Bulletin★ has made a preliminary survey on dehydrated foods. It covers food markets which form a cross-section of the important Philadelphia market. This first survey is not the final word in retail surveys on the subject. But it *is* an important straw in the wind.

NOTE: The results of this current survey are available for any manufacturer who is interested in the dehydrated food market. A phone call or letter will bring them. Address: The Evening Bulletin, Philadelphia, Pennsylvania.

★*The Evening Bulletin is undisputed food leader in Philadelphia. National food advertisers are concentrating nearly 3 times as much linage in The Bulletin as in any other Philadelphia newspaper . . . 47% more than all other dailies combined! More than 8 out of every 10 food shoppers in Philadelphia say they are most likely to look in The Bulletin for food advertising.*

IN PHILADELPHIA—NEARLY EVERYBODY READS THE BULLETIN

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THE COVER

Wide World Photo

What food processors are doing to save shipping space is exemplified by the concentration of orange juice. As packed for shipment to the United Nations, the juice contains 72 percent solids, as compared with 12 percent in normal juice. The juice content of 12 to 13 boxes of oranges is put into 6 cans.

Illustrated on the cover and reproduced above is a picture of one of the quality control operations involved in making the concentrated orange juice. Women workers use suction devices to pick stray bits of skin and seeds from the juice as it flows across a plate glass trough. (See editorial on page 37 for discussion of need for reducing the volume of processed foods.)

FOOD INDUSTRIES

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This Issue

The Pudding Test

Proof of the pudding being in the eating, the only way to determine whether dehydrated foods have been properly handled from raw material to consumer is to grade them by taste tests. Such quality grading must give consistent and comparable results. A method meeting these requirements has been worked out for dried eggs, the method being applicable in principle to other dehydrated foods. Roger Wilson and Harry Slosberg, research department, Continental Can Co., tell about it on page 56.

Keep 'Em Rolling!

Everyone knows by now that machines and materials must be conserved as much as possible to aid the war effort. But many do not know how best to effect the desired conservation. So articles telling what should be done are being published in FOOD INDUSTRIES. In this issue are "Look After Your Labelers," page 48, and "How to Get the Most Out of Belt Drives," page 51. In the first, Sidney Carter, chief engineer, Economic Machinery Co., gives specific instructions on how to make labelers last longer. In the second, J. R. Hopkins, Chicago Belting Co., does likewise for belts.

Make Your Machines Last

If processing machinery is to operate under an ever increasing load, with little or no chance for replacing it when it wears out, then it is up to the food manufacturer to make this machinery last, and the method used to prolong its life must, certainly, make no increase in labor requirements.

One step that can be taken is to improve the lubrication of moving equipment. In some cases, this means the use of automatic, central lubricating systems, which reduce the labor demand while assuring adequate lubrication. Examples of how this is done are given in the article beginning on page 41.

Better Storage Methods

Tin shortage and war demands for processed foods put a premium on fresh foods for U. S. civilian consumption. And that means more and better storage—both cold and frozen.

This situation gives particular interest to improved cold storage methods developed in connection with apples. Quick removal of field heat has been shown to improve the keeping quality of the fruit. How this is done by brine sprays is told on page 59.

Coming

Engineered Dehydration

Growth of vegetable dehydration has been so rapid, and the pressure to expand has been so great, that not enough time has been available to some processors to put their operations on a sound engineering foundation.

However, it is fortunate that some qualified engineers have given attention to these matters of engineering. W. B. Van Arsdel, chief of the engineering and development division, Western Regional Research Laboratory, USDA, is one of these engineers. FOOD INDUSTRIES fortunately has been able to obtain a series of articles on the engineering of a vegetable dehydration from Mr. Van Arsdel. The first will appear in an early issue.

Save Those Scraps

Too many of us think of salvage as something for the other fellow to engage in, while we hang onto our own junk piles, firmly believing that some day we will need that leaky tank, broken-down filler or rusty pipe. But we too must sacrifice—even such treasured relics of a happier day—if this war is to be won.

Of course, many plants are already going to town on salvage. What some of them have done will be told in a forthcoming issue.

Customer Worth Pleasing

Purchases of processed foods by the government include about 300 different items. And orders have been placed for one and a half billion dollars worth of these commodities. Every day AMA is moving from 700 to 1,000 carloads of raw and processed agricultural commodities from interior assembly points to Atlantic, Pacific and Gulf ports. How AMA does its buying will be told, and several helpful hints for food processors who take government orders will be given, in an article to be published soon.

Britain's Package Changes

Three years of wartime conditions have necessitated many changes in British food packaging, which is not surprising in view of what has already been done here. An article discussing the changes in England will be published in an early issue. The author is Denys Val Baker, who lives in England and has observed the changes first hand. This article may suggest some possible package changes that have not occurred to American food processors. In any case, it offers you company in your food packaging misery.

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor SEPTEMBER, 1942

Compressed Foods Needed— Dehydration Is Not Enough

TECHNOLOGIC changes, always, accelerated by war, are soon to appear in the food processing industry with a vigor that will jar the sensibilities—if not the teeth—of those who have not given thought to the future.

Next year will see unusual demands on food processors that will tax their utmost resourcefulness. You don't need any official pronouncement from the President, or the Food Requirements Committee, to warn you of coming change. You can figure it out for yourself. But you must get ready as best you can.

One of the biggest factors in wartime food processing is the enemy submarine. We haven't licked it yet. U-boats have sunk more than 400 cargo ships since Dec. 7, 1941.

Russia has lost half of its farm lands, and may lose still more before the United Nations can really get going. Russia must be kept in the war.

Demand for steel in this country is so great that the projected Higgins shipyard in Louisiana had to be canceled. There isn't enough steel to go around. Yet steel food containers in 1941 took 2,750,000 tons. Rubber for closures is as scarce as hen's teeth.

Our armed forces are all over the world—in Greenland, Iceland, Eritrea, Great Britain, Egypt, Central Africa, China, Australia, South America—and all must be fed as well as supplied with munitions. So also must our allies.

Except for the acute shortage of ships, we in the United States would have no comfortable food surpluses other than cereal grains. If there were enough ships our food exports would be enormous—they are huge as it is.

Shipping shortage furnishes the clue to the shape of things to come. Because of losses, the ships that still remain afloat must do double duty. We have got to win the war with what we have. This means compressed foods.

For a time it seemed that dehydration alone would solve the food preservation problem. And so it would, except for the ship problem. Now it is apparent that we must not only preserve much of our perishable foods by dehydration, we must also compact the dehydrated products into the smallest possible space. If cargo airplanes are built, the need will be still more imperative.

Every possible trick and device must be developed for conserving shipping space, first for Lease-Lend exports and for our own armed services, and next for our domestic consumption. Nothing should escape our attention. In Washington are men who are not food men and they are asking why this or that food should not be compressed. Even sugar and flour are coming in for attention. Food technologists must supply the answers.

Secretary Claude R. Wickard, chairman of Food Requirements Committee, has said that from 40 to 50 percent of the shipping tonnage used in supplying the United Nations is for food. Half of the space on the ships that still float is needed for food, yet our own forces need also arms, tanks and fighter planes.

Read his own words from *The New York Times Magazine*, August 9, 1942:

"The food strategy of the United Nations looks at the total available supply as one stock pile. The problem to be solved by the food strategists is to see that the total supply is great enough and that it is put where it is to be used with the least expenditure of shipping and man power.

"Essentially, the combined food board has one big job to do. That is to make plans that will cut down the tonnage required to transport food across the seas. Even in wartime food takes up 40 to 50 percent of the tonnage used in transporting goods among the United Nations. The job of the combined food board is to shrink that percentage. Every point we can shrink it means just that much more tonnage for troops and munitions and raw materials for munitions."

Plainly the rôle of food technology is to provide compressed, dehydrated food that is palatable and nutritious. And it must be done in enormous quantities.

If you think the job is for somebody else, you might ponder this list: fruits, vegetables, meats, fish, coffee, cheese, milk, butter, flour, sugar, soups—where space and weight savings are possible. Every one of them is needed in a more compact form to help win the war.

L V Burton EDITOR

The Talk of the Industry

● A TEN-YEAR food emergency lies ahead of us. Regardless of how long the actual fighting continues, the food emergency facing the United Nations will last at least 10 years. That was the verdict of a group which met in

the WPB in midsummer to consider ways of coping with future food problems.

Ten years is a long time, and it calls for long-range plans.

Whole-wheat Flour Storage Life

Wartime conditions in Great Britain have compelled a study of all the factors governing the storage life of the high-extraction flour now made under the name of National Wheat Meal, for no scrap of food may be wasted. A year's investigation has shown that two important factors govern the storage life—moisture and temperature of storage. (*Milling*, May 23, 1942.)

Under good storage conditions, the high-extraction flour made from good, sound wheat will keep in good condition as follows:

14 percent moisture .....9 months
14½ percent moisture...4 to 6 months
15½ percent moisture.....2 months

The effect of temperature is shown by the fact that 15½ percent moisture whole meal remained in good condition for 11 weeks at 60 deg. F., whereas at 77 deg F., it remained good for only 3 to 4 weeks.

British climatic conditions differ so much from United States conditions, being damper and generally cooler, that experience gained there may not always be applicable here. Such high moisture content as 14½ or 15½ percent seldom finds a counterpart in this country. Yet the data developed by the Research Association of British Flour Millers suggests ways in which we may improve the keeping quality of high-extraction flours in the United States.

Insect infestation that becomes aggravated in high-extraction flours can, of course, be prevented by suitable treatment and packaging.

Time Factor In Distribution of Dehydrated Vegetables

Something very fundamental must be learned by food company management in adapting itself to the war-imposed changes of the day. If you have been a canner or a glasser of vegetables, the job will be more difficult for you than for someone who has had long experience in dealing with certain other foods that are not so long-lived.

What must be learned is how to manage the distribution of a product with a definite limitation on its merchantable life. Canners of all vegetables and most fruits have learned to think business-wise in terms of a product that remains in prime merchantable condition for much more than a year. Some canned foods remain good for more than 30 years, others for considerably less. For ordinary commercial thinking and business purposes, however, the canned products are subject to the economics of nonperishables. They never have to be sold at sacrifice prices lest they spoil and become worthless.

But now we come to dehydrated foods, especially dehydrated vegetables, which must soon make their appearance on the domestic market. Many dehydrated foods have a merchantable life that, in the present state of the art of dehydration, is measurable only in months—not in years. After a certain period of time, depending on the packaging and on storage conditions, deterioration sets in and a noticeable loss of palatability occurs. Because of this, some canners have been most reluctant to consider dehydration of vegetables for the domestic consumer market.

Such reluctance is short-sighted and is probably based on experience in a single line of business. Any properly prepared and packaged dehydrated vegetable will have a period of at least five or six months in which its quality is as good as when it left the factory production line.

Is this too short a merchantable life for a commercially successful operation? Not if your distribution plans are geared to that condition. Nobody in other food lines has failed by reason of much shorter product life. Some foods are merchantable for only two days!

If you think six months is too short for success, take a look at the other fellow's problems and then decide that he has licked many much tougher jobs.

Here are a few products that have limited merchantable lives, yet their producers somehow make a success of their enterprises.

Bread .....1 day
Milk .....2 to 4 days
Pork, dressed .....about 15 days
Beef, dressed .....about 30 days
Ice cream .....1 to 3 months
Beer, keg .....2 to 3 months
Marshmallows .....1½ to 3 months

If the other fellow can do it, you can do it, too. It is important, however, to know definitely how long a merchantable life you can count on. Your research department must work that out for you. If you don't have a research department, then hire a consulting laboratory. Your distribution plans must be based on exact information.

● AN ardent prohibitionist in the Bible Belt of the South avers: "We had rather walk than ride on tires made of alcohol. Let us refuse to use

this product of an evil industry in any way, shape, form or fashion, as we have in the past."

Wonder if he is consistent and refuses to use vinegar, flavoring extracts, mayonnaise, pickles, or catchup?

● HEINZ has come out with a new line of concentrated soups—anyway they sent us a copy of the new label. Under the original tin conservation order, M-81, no soups could be canned

except those that were to be diluted with an equal volume of water or milk before serving, which is irreverently referred to as the Campbell Soup Clause. Looks like canned soups are coming back—for a short spell. After that one suspects we shall see dehydrated soups as well as the current dehydrated soup mixes.

Compressed Flour

Current need for concentrated food to conserve marine shipping space is stimulating studies on mechanical compression, as well as dehydration. It is being tested out in flour for, as every flour user knows, it contains a lot of air that serves no useful end except when actually incorporated in a dough.

The amount of air in flour is estimated to be about 50 percent. Efforts to remove a large portion of it by slow compression have been successful to the extent that a solid block of flour can be produced that has only two-thirds its original volume. While it is mechanically successful, the process is far from perfection. Compressed flour has been baked properly, but it is too early to state decisively that this method of conserving shipping space is a commercial possibility.

Astonishing Losses Of Vitamin C

When Dr. Frederick F. Tisdall of Toronto spoke extemporaneously at the Symposium on Dehydration, American Institute of Nutrition, Boston, April 1, 1942, many in the audience were astonished. For Dr. Tisdall said that mere act of grating either raw potatoes or raw apples would cause the complete disappearance of all the vitamin C. (See FOOD INDUSTRIES, May, 1942, page 76, where this comment was reported.) He also said that the mere act of chewing these foods caused destruction of half their vitamin C, exclaiming: "Thank God for the tomato and the orange! They don't act in the same way."

His remarks were prompted by complaints from Col. Paul E. Howe, Medical Corps, U. S. Army, that dehydrated potatoes were often totally lacking in vitamin C, which occasioned much trouble in the Army's effort to provide troops with adequate nutrition. Since Tisdall's remarks, others have reported like results.

Pyke, *Nature*, vol. 149, 499, 1942, and Lampitt, Baker and Parkinson, *Nature*, vol. 149, 697, 1942, have reported comparable results on the losses of ascorbic acid in savoy cabbage after chopping. The latter find that the type of chopper used will exert an influence on the destruction of the vitamin, one machine destroying about 30 percent while a different type destroyed about 65 percent in a few minutes. Nothing was reported regarding chewing losses. But it is evident that here is an important unexplored field of food technology.

Two ideas occur regarding the foregoing observations by Tisdall, Pyke, and the others:

1. If our nutrition standards have been based on the original ascorbic acid content of certain raw foods before eating, how much of the vitamin has been made really available to the human body? Is it not advisable to restudy the whole matter immediately? Are we not perhaps unwisely assuming that the food set before us is nutritionally adequate when as a matter of fact it may not always be?

2. If the type of equipment for cutting up vegetables prior to dehydration is a factor in its vitamin-C retention, here is a field that deserves prompt study, for the belief is rather general that whatever causes a loss of ascorbic acid also causes a loss of quality and palatability.

The Lampitt, Baker and Parkinson paper indicates that, the greater the amount of juice that can be pressed

Hors d'Oeuvres

• Secretary Wickard foresees the substitution of dairy products for beef in the diet. But why worry, they both come from a cow.

• *More cheese is now available for domestic consumption than ever before. So eat more cheese and help bait the trap being set for the international rats.*

• "Pink drinks for pale people" is the latest wrinkle at a sweet shop in Manhattan. Raspberries! That's what they make 'em pink with.

• *Now they're dehydrating butter. Wartime changes in food processing are to be expected, but one might expect a limit.*

• A sailor home on leave in Wisconsin struck a metallic object while cutting a cheese. A concealed bomb, he thought. But the police found only a dairy thermometer. Food processors ought to be more careful—new thermometers are hard to get.

• *In England about 1887 a "check-valve" closure was used for bottled beverages. So suppose the bottlers quit worrying about caps and use bottles with a little wooden ball sealed into each. The buoyancy of the ball plus the pressure of the carbon dioxide would automatically seal the bottle when it was filled, or are we a little balled up?*

• In this country and in Italy wool is made from milk. In Germany they make food from sawdust. In the Argentine they use corn to fire boilers, while in this country we make rubber from it. In Japan they make gasoline out of rubber and here we make rubber out of petroleum. And the whole world is making hell out of hatred.

• *Price Administrator Henderson has launched a campaign to end "flagrant profiteering" in the sale of beer and soft drinks to members of the armed forces in areas near camps. Why not put these chiselers into uniforms and send them to a desert outpost—sans canned beer?*

• A most effective method for saving sugar is used in a restaurant in Nebraska. The management places a little American flag in each sugar bowl. Dipping twice into the sucrose makes the diner feel like a Hirohito heel.

• *Apple sirup is said to be as good as glycerine in the manufacture of smoking and chewing tobacco. Which makes the apple not only a food and a beverage but a smoke and a chew. And some who have partaken of "Jersey lightning" would also call it an anaesthetic.*

• Accident frequency was up 15 percent and severity 44 percent in the food industries in 1941. Falls accounted for a large percentage of the accidents; that is, a lot of workers fell down on their wartime jobs last year.

• *"Keep slender with milk. No dangerous curves ahead," is a new slogan for women, sponsored by National Dairy Council. Maybe we're misinformed, but we thought dangerous curves were an asset to the ladies.*

• It is belived unwise, says a high-ranking Army officer, to deny a soldier, during his few hours of leisure, the privileges enjoyed by other citizens. One of these privileges is beer, though, of course, that is not the only one.

• *"Dead animals ascend through price ceiling," says the OEM paper, "Victory." Really, that's carrying inflation just a bit too far.* F.K.I.

out after comminution of savoy cabbage, the greater the destruction of vitamin C. This is confirmed in principle by Tisdall's informal remarks. Together, the observations suggest that sharp knives and large, coarse cutting may be a factor in quality maintenance in a manner heretofore unsuspected.

AA-3 Priority For Dehydraters

Credit the Food Requirements Committee with one good accomplishment. It has obtained a priority rating of AA-3 for necessary dehydration equipment. This rating is, for the present, limited to the use of those holders of contracts to produce dehydrated foods for Lease-Lend and for the armed forces. First grants of the AA-3 rating appear to have gone to spray dryers for milk. You will recall that there is too much canned evaporated milk on hand. This, together with the need for conservation of shipping space, has brought about a demand for a change to spray drying.

Such a high priority rating is not open to all comers. There is a catch in it. Only those firms that have practically all the equipment needed for such conversion, except possibly the dryer itself and its accessories, will be allowed the coveted AA-3. Furthermore, there must be a presumption that the technical personnel know enough to operate the dryers satisfactorily so that precious food will not be spoiled and still more precious scarce metals will not be placed in the hands of incompetents.

All of current Washington thinking is toward conversion of existing food plants to dehydration rather than encouraging newcomers to start from scratch.

How To Find Used Equipment

Even though OPA and WPB seem to be getting their wires crossed, you will be interested in the new set-up in the Conservation Division in WPB, called the Surplus Used Equipment Section. OPA says it also has something of the same nature. But WPB's Surplus Used Equipment Section (SUES) is now a going concern.

Before going further, however, get one fact straight: WPB has nothing for sale. It merely knows where the stuff is located and who has it for sale. SUES is not even a broker of used equipment; it is merely an information office with vast files of detailed information about surplus used equipment.

For used equipment other than construction machinery or machine tools, the SUES should be consulted after you have exhausted customary nearby sources. It has a list of 3,000 surplus boilers ranging from 100 hp. up to 250,000 lb. of steam per hour capacity; 20,000 motors; 1,000 engine-driven generators; 400 turbo-generators; 300 motor-generator sets; 350 diesel-generator sets; 350 diesel engines; 100 gas engines; 5,000 items of miscellaneous equipment, and so on. These lists are being expanded actively and will soon be about three or four times their present size.

If used equipment will fill your needs here is a way to find out who has it. After that it is a matter between buyer and seller.

FRC Having Its Troubles

The Food Requirements Committee is having trouble getting started on its important task. Seemingly, it is devoting most of its attention to the future problems of getting next year's crops produced, and the crops of succeeding years. During recent weeks a four-cornered, behind-the-scene, dispute has been going on between the FRC, the Selective Service Administration, the War Man Power Committee, and the WPB over the matter of how farm crops are to be produced. FRC takes the stand that farmers must either have men or machines, that if the Army takes away most of the man power then the farmers must be allowed to have more labor saving machinery. But WPB has ordered curtailment of production of farm machinery and refuses to budge. So FRC is battling every opposing agency, and Secretary Wickard even has been campaigning in the Middle West to enlist popular support.

This phase of the fight on the home front is more a Department of Agriculture matter than a Food Requirements Committee matter. It must, of course, be threshed out and a sensible compromise policy established. (There can be no happy solution.)

But "men or machines" for farmers is not enough. FRC must also push ahead on other fronts. Machines for food processors or hunger for untold millions is another agonizing alternative that must also be settled. For the food processing industry must be supplied with the equipment it needs for food preservation in 1943 under the rapidly changing conditions of the day, or we and our allies will not have enough to eat in 1944.

If the present Food Requirements Committee cannot cope with its problems then there must either be a new set-up or a new committee.

School for Dehydrater Operatives

The United States Department of Agriculture will hold two schools for training actual operating men to run dehydraters. One course of instruction will be held in the Western Regional Research Laboratory, Albany, Calif., in September. The other will be held at the Rochester, N. Y., plant of Beech-Nut Packing Co. in October.

Attendance is limited to the very men who will actually operate the dehydraters. Instruction will be without charge, but the employer must pay the expenses of his own man. The course of instruction will last about 12 days and will be just about as intensive in its way as the training given to Commando troops. Which means that it will be anything but a holiday for the men. They will be at work, in classes and attending lectures from morning to late at night. About 200 men are expected to attend each school. Instructors will be some of the best known food technologists in the country. Admission is by invitation only.

The huge number of persons who might want to attend the schools because they want to keep up with the procession, or because they might want to see how their wares might fit into the dehydration scheme of things, cannot be accommodated this year. If you are an employer, you cannot attend unless you can prove that you yourself are the person who will actually operate your dehydration equipment. But you can send your own men who will do the supervising job.

To get the most out of the schools it is advisable to send men who are students, preferably men of good education who have been accustomed to learning and to study. The man with the best educational equipment will be the man who will absorb the most from the intensive course of instruction.

ENGINEERING

Pressure Oiling Saves Machines • Conveyors Help Retain Quality • Selecting a Hoist

Automatic Lubrication Saves Labor and Cost, Makes Machines Last

By F. M. HEWITT and M. N. RIPLEY
Bijur Lubricating Corp., Long Island City, N. Y.

Centralized automatic pressure systems of machinery lubrication are one means of insuring trouble-free operation and long life for food processing equipment, to meet the demands for increased production growing out of the war

URGENT food-processing problems are multiplying, and automatic lubrication is being called upon to serve as "man-of-all-work" in helping to cope with them.

U. S. A. and Allies' demands for processed-food shipments are going to tax the production facilities of many a factory. Labor costs and diversion of labor to armament industries will cause many a headache. And new federally sponsored health and nutrition standards may introduce unavoidable complications.

Food-processing machinery already is hitting a new high in speed, capacity, versatility and efficiency. *Sustained* efficiency is at a premium—with machinery replacements becoming more and more difficult, and armament requirements having the right of way.

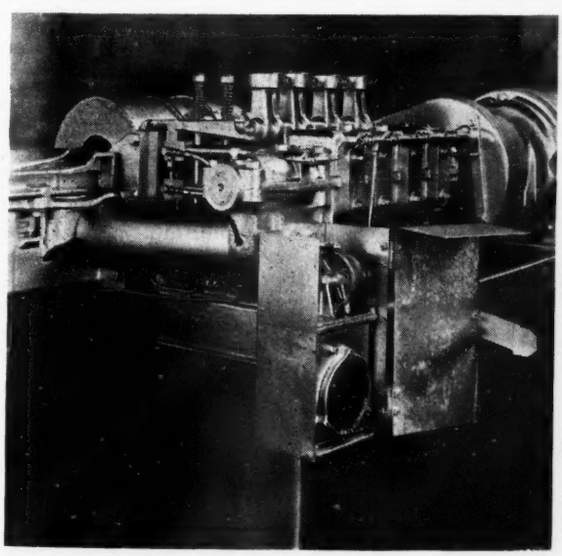
All of which helps explain why full-automatic or semi-automatic processing machinery is coming into its own.

This in turn implies the most modern lubrication methods—among which the centralized automatic pressure system is widely favored. The system affords complete control of lubrication in quantity, frequency, and cleanliness, and makes the control automatic. It tends to avoid any "human element" or factor of neglect and forgetfulness, besides effecting a labor saving. It solves many other incidental problems of lubrication.

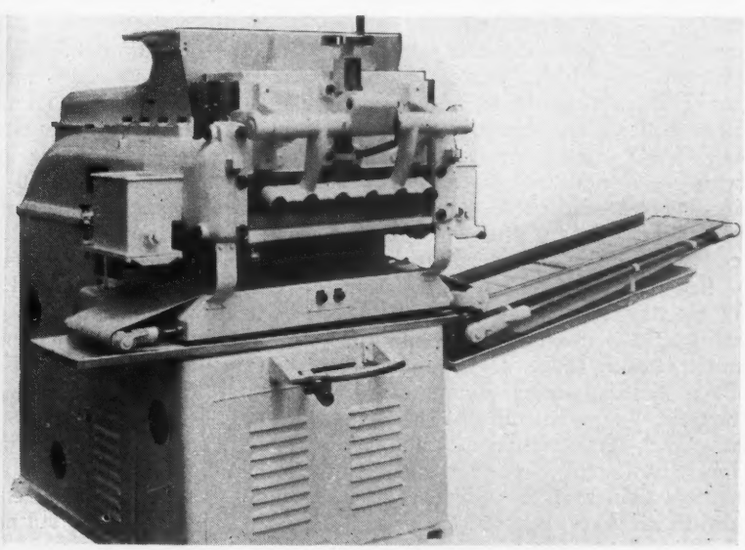
In fact, built-in automatic lubrication is now a requisite in the design of numerous advanced machine models, by reason of their exacting and often complex requirements. Higher speeds thus are made possible, efficiency is maintained at maximum, repairs and shutdowns are decreased, power losses are cut, and machine life is prolonged. Cleanliness also is promoted, and more easily held at desired standards of sanitation.

How Lubricators Are Used

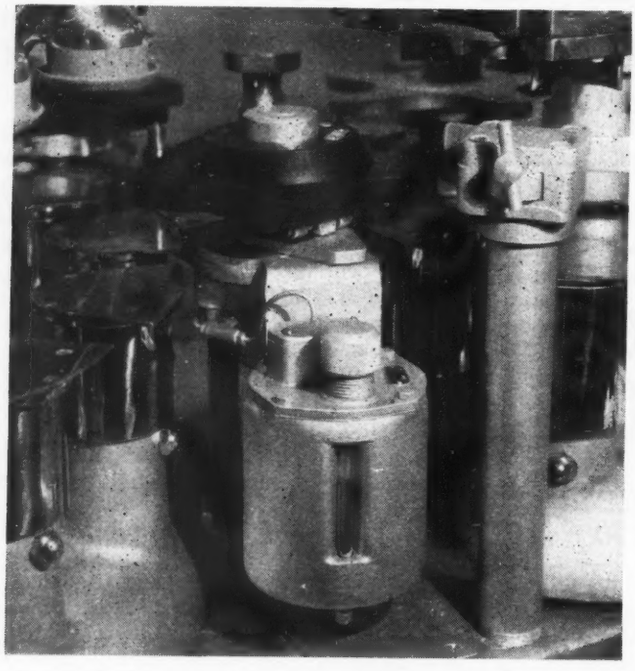
One example is the Universal corn cutter, manufactured by the Sprague-Sells Division of Food Machinery Corp. Its "continuous" type of automatic lubricating equipment consists of an oil reservoir (which also contains the lubricator pump) and a branched feed line which delivers oil to 27 meter units. Each meter unit serves a bearing and automatically lubricates it with



Universal Food Machinery Corp. corn cutter, showing reservoir and drive mechanism for lubricator pump at rear of machine, also distribution system fittings.



Six-pocket Baker-Perkins loaf dough divider on which automatic pressure-lubrication equipment is used to feed edible oil to those surfaces which are in contact with the dough.



Close-up of automatic lubricator on Mojonnier vacuum milk bottle filler. Note care with which reservoir is sealed. In this instance, contamination of oil by milk, or milk by oil, are equally to be guarded against.

the correct oil film required.

The lubricator pump is operated once per minute by a rapid-drop cam and gear reduction unit on the reservoir. At every stroke of the pump piston, a predetermined quantity of clean, filtered oil is delivered under pressure to the distribution system feed line tubing, and is accurately apportioned to the bearings by the meter units.

Each of these cutter head and feed roll shaft bearings receives from its meter unit one drop of oil per minute. Accurate control of the oil feed is vital because, if an excess quantity were discharged by any meter unit, oil would contaminate the corn being handled. On the other hand, lubrication must be dependable in order to prevent starch from entering the bearings. Hand oiling would mean constant vigilance, with the possibility of neglect and bearing failure—especially since highly skilled labor is not often available for canning operations of this nature.

Bakeries stand a much better chance of meeting exacting delivery schedules when their machines are lubricated automatically. Take, for example, the Baker-Perkins pocket dough dividers or the B-P 8-pocket roll divider. Dough is sticky, and centralized automatic lubrication steps somewhat outside its normal field to feed *edible* oil to the divider surfaces in contact with the dough and to help maintain the divider at peak operating efficiency and accuracy during high-speed, big-production runs.

The Baker-Perkins 6-pocket loaf dough divider — which automatically and accurately divides dough into pieces of uniform weight for making into loaves—has a scaling range of 8 to 36 oz. and a capacity of 1,800 to 7,200 pieces per hour. Three automatic pressure lubricators of the "continuous" type supply the edible-oil—a "divider" oil which is tasteless, odorless and colorless.

Two of the lubricator pumps draw oil from a common oil reservoir of about 2-gal. capacity. One pump operates a system which furnishes oil to the face of the division box. The other system supplies oil to each of the pistons and pockets in the division box. Oil is metered to the machine surfaces through approximately a dozen meter units.

The rate of feed averages about 30 cycles per minute, the quantity of metered oil feed averaging about two drops delivered by each meter unit per cycle. Such positively controlled lubrication is essential to smooth operation. Lack of proper lubrication, for example, would tend to cause jerking or chattering of the division box while in motion.

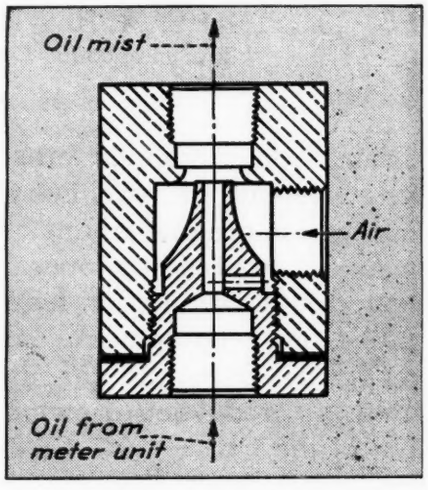
A third automatic lubricating system —with the pump drawing divider oil from a 1-gal. reservoir—furnishes oil to surfaces of the horizontal knife, ram and interior walls of the dough chamber.

Meter units are not utilized by this particular system. Instead, the oil is supplied by the pump to *drip coils* at the rear of the hopper, at a rate proportionate to the speed of the machine. Feed from the different drip coils must be held uniform, however, as evidenced by the fact that an unevenly or inadequately lubricated knife is subject to possible "overloading" through excessive friction. The rear extension of the dough chamber forms the oil catch, for reclaiming all excess oil supplied to the knife, ram and dough chamber surfaces. This excess is returned by drain pipe to the oil reservoir. The sludge from this used oil settles in the reservoir, explaining the choice of drip coils instead of meter units for the system.

Lubricators in the Milk Plant

For the Mojonnier vacuum milk bottle filler, automatic lubrication does an "automatic maintenance" job. Besides lubricating some 32 bearings, the automatic system oils the cup leathers of the bottle-lifting pistons, thereby keeping the leathers soft and pliable. In the filling and capping operations, the bottles are automatically positioned by air-pressure lifting pistons sealed in their cylinders by means of the cup leathers, and the seal must be positive.

Operators of the Mojonnier milk bottle filler report a daily saving in oiling-time of more than 15 minutes, by use of the automatic system. It includes



Sectional drawing of air line lubricator for Mojonnier vacuum milk bottle filler by which oil from the lubricating system is vaporized before contact with bottle-lifting piston cup leathers.

an oil reservoir of somewhat more than 1-qt. capacity and a "continuous" type of lubricator pump driven from a rocker shaft. Positive and reliable lubrication, essential to keep the bearings of this machine in perfect condition, is consistently maintained. Such metered oil feed, with the quantity of oil film definitely pre-determined and automatically controlled, eliminates all guessing as to the amount of lubricant needed and applied.

There is an interesting "air line" lubricator used in various Mojonnier fillers for milk, mayonnaise and other foods. Referring to the accompanying drawing, air enters from the right. As the oil delivered by a meter unit builds up in the vertical hole to the top of the cross-hole in the air line lubricator, it is drawn into the air line by the slight vacuum, developed at the venturi. The oil is ejected in the form of mist from the air line lubricator, this mist being employed to lubricate the cup leathers.

One of the machines used in many beverage plants is the CEM 20 siruper-filler-crowner. What lubricating system can satisfy its varied demands? Some of its parts require continuous oil feed, but at a very low rate; others need lubrication much less frequently yet no less dependably. A principal objective is to keep bearings full of oil—keeping out water, sirup and glass. (In this respect, the requirement is comparable to that for the Mojonnier vacuum filler lubrication.)

One of the illustrations shows a "spread out" section of the CEM 20 rotary siruper-filler-crowner (manufactured by Crown Cork and Seal Co.), featuring its automatic lubricating system that takes care of many of the machine parts. The oil film is metered to each bearing in the exact quantity needed according to its individual size, speed and load. Both intermittent and continuous feeds, under the pressures desired, are provided from the same system. CEM bottling machines often are sold to bottlers at the far corners of the earth, where servicing is difficult and maintenance must be held to a minimum. Operators cannot be expected to be expert mechanics. Smooth, perfect operation of these bottling machines is assured merely by keeping the lubricator reservoir properly filled with oil. A low-level illuminated warning signal is furnished, and an automatic low level cut-off stops the machine should the oil level in the reservoir reach a minimum safe level.

Note the "high-pressure cyclic" and "low-pressure continuous" feed lines from the same lubricator. Lubrication of these CEM machines is planned so that oil delivery to bearings served by the "cylic" feed line varies directly with the speed of the machine, while the feed to those points served by the "continuous" feed line is independent of the machine speed. Rate of oil feed at each outlet is determined by the meter unit selected.

The Meter Unit

It should be explained that the meter unit is a resistance fitting, consisting of metering chamber (flow rate being governed by clearance between pin and passage wall), felt filter at inlet, and check valve at outlet. Only clean oil, in predetermined quantity, reaches the bearing it serves. No adjustment of these meter units is possible or necessary. Their check valves maintain the system full of oil at all times—with no waste, drip or drainage between pump operations. Consequently, too, there is no lag in feed—although for additional safeguard a finger pressure on the "instant feed" button will enable the system to be instantly flooded on starting up after any prolonged idleness of the machine.

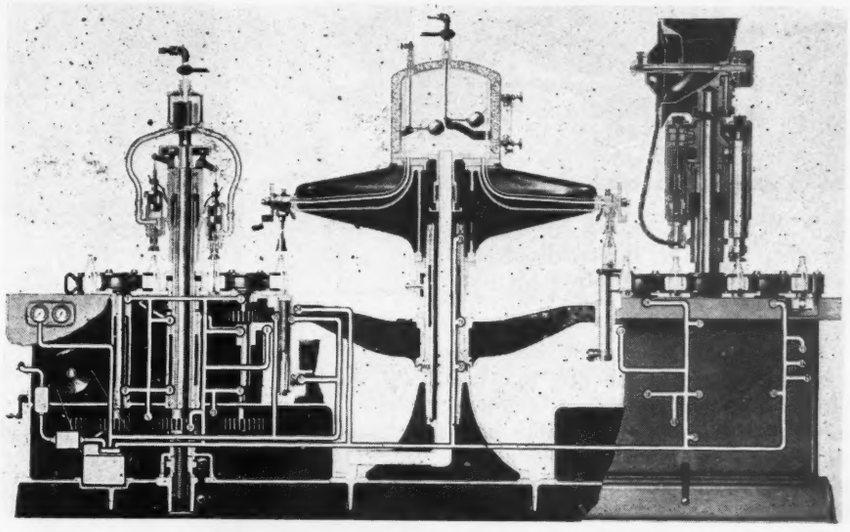
Automatic lubricator pumps can be driven from either reciprocating or rotating parts of a machine. The pump-and-reservoir unit may be installed at any level in relation to the positions of bearings. Great flexibility in the arrangement of the lubricating system is possible, and it is adaptable to virtually every machine design and requirement. Such "built-in" installations—always the most efficient—involve no great design alteration or engineering expense.

In the case of the CEM bottling machine, automatic lubrication is justified if for no other advantage than the doing away with an otherwise tedious, messy lubricating job underneath the equipment.

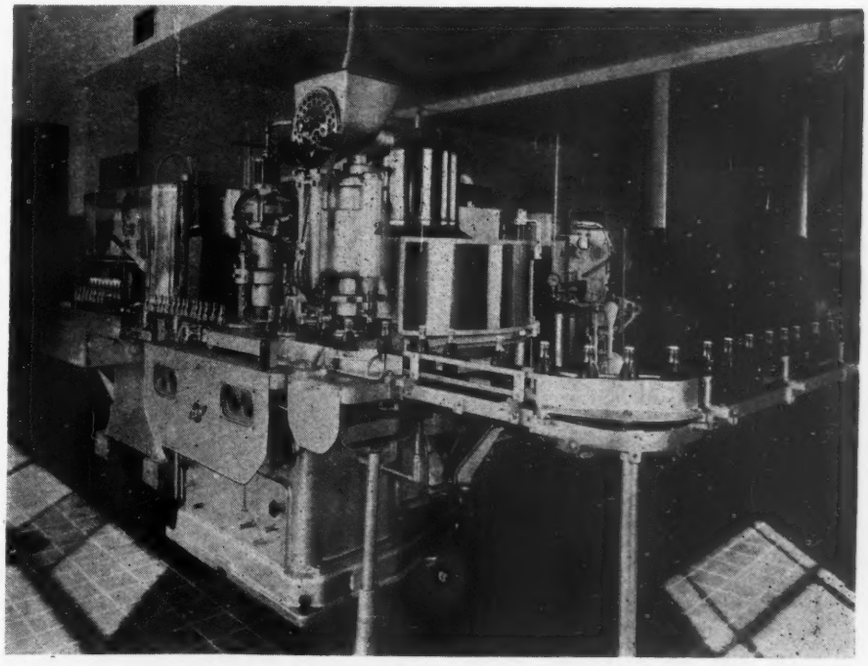
Feeding Edible Oil

Let us see how the Sweets Company of America keeps its plant equipment lubricated. Candy is even stickier than dough, and "Pops"—those globular "all-day suckers"—offer no exception. "Continuous" type lubricating systems are employed to provide metered feed of edible oil to molding dies and feed wheels for each "Pop" machine.

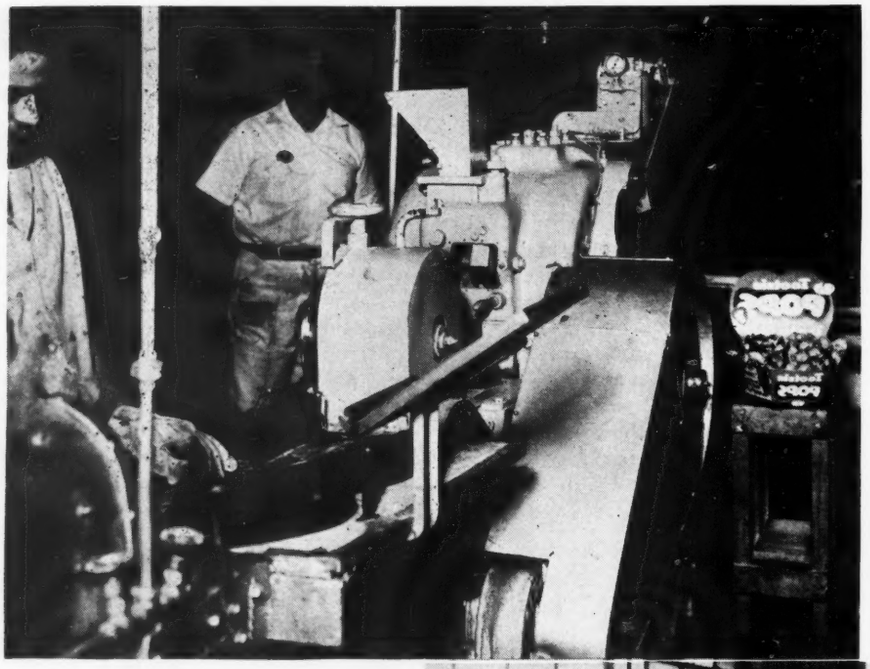
Another lubricator application in this



Schematic view of lubricating system on CEM 20 siruper-filler-crowner. Note two separate oil lines from the single lubricator. The upper line feeds its bearings continuously, whereas the lower line is in operation for only about 20 seconds out of every half hour.



General installation view of CEM 20 (automatically lubricated).

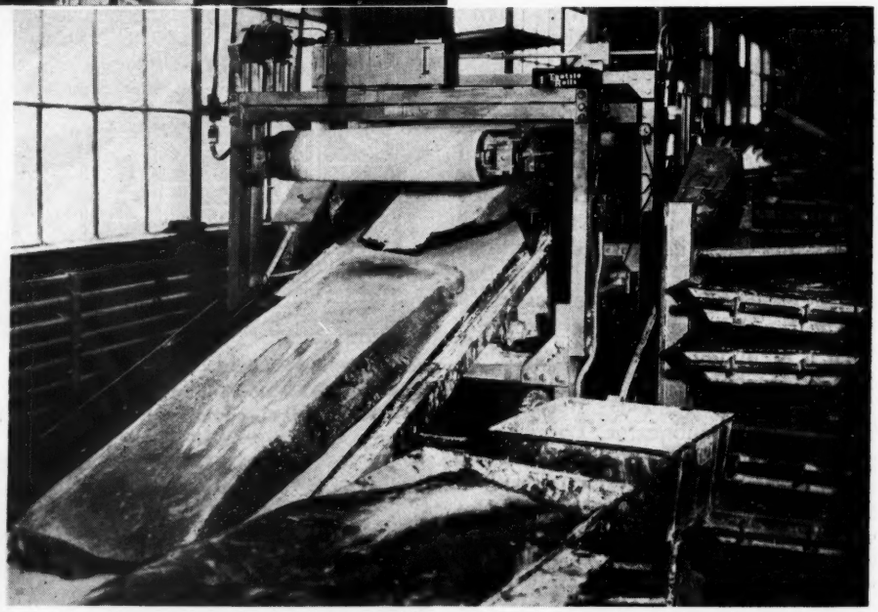


course is the time when it needs lubricating.

Modern machines in the food industries often represent a very substantial investment. This investment is protected by automatic lubrication which also reduces servicing on the part of the machine manufacturer. Depreciation is lessened—machines become longer lived. Many other money savings—in oil, power, oiling time, spoilage, maintenance—are assured the machine user. And in maintaining machine accuracy.

LEFT: Special candy machine to form globular "Pops." The hot sugar batch is kept from adhering to dies and feed wheels by a controlled feed of edible oil through an automatic lubricating system. BELOW: Slabs of "Tootsie Roll" dough entering long oven. The steel conveyor belt is "buttered" with edible oil by means of a gang dripper fed from the special lubricator shown above the belt.

Courtesy Sweets Co. of America



plant is where "Tootsie Rolls" are conveyed on a 125-ft. oven belt of steel. Here, automatic lubrication "butters" the belt to keep the candy from sticking.

In fact, nowhere in the factory do you observe candy adhering to wheel, mold or belt. The reason is automatic lubrication—filming with edible oil the surfaces in question. A "continuous" lubricator, with gang drip feeder, is utilized to lubricate the surface of the steel oven belt. Twenty-five meter units are spaced 1 in. apart across the belt, the oil being discharged from meter units through "tail" tubes to belt surface. Positive regulation of the quantity of feed is insured. Any waste of oil, with its costly and often awkward consequences, is avoided. Production schedules are upheld without frequent interruptions for machine cleaning and adjustments.

In another section of this candy-making plant, a battery of special Package Machinery Co.'s wrapping machines wrap hundreds of the "pops" every minute. Inspection of these complicated mechanisms reveals the same type of automatic lubricating equipment, but this time feeding controlled quantities of machine oil to bearings. Here the problem is increased because sugar dust will "freeze" the bearings if they are not properly lubricated, yet an excess of lubricant would be highly objectionable in a confectionery plant. Such small, complicated mechanisms offer special clearance and feed problems.

Positive control and regulation of oil feed, and the fact that modern automatic lubricating equipment provides a "closed" system, give complete protection against contamination of food products or spoilage of printed wrappings, and so forth, through oil contact.

Not only is contamination avoided, but the safety of machine operators is promoted as well. There is no oil drip from the system to form pools of oil and cause accidents through oil-slippery floors. Fire risks also are decreased. Moreover, automatic lubrication prevents all such accidents as occur when operators—despite instructions forbidding the practice—attempt to lubricate machines by hand oiling while the machinery is in motion. An automatically lubricated machine is self-oiling. This self-lubrication is effected while the machine is running—which of efficiency and cleanliness, automatic lubrication helps insure a higher quality product and bigger volume production.

In brief, automatic centralized pressure lubrication with controlled metered oil feed provides an advanced method that has made most lubrication worries and problems quite unnecessary.

Pumps Used

Incidentally, the pumps used in automatic lubricating systems can also be employed to handle other liquids used as ingredients or in the processing. Such pumps are of various types: "Continuous," "high-pressure," "one-shot," hydraulically operated, and solenoid-operated—ranging in capacity from large volumes down to the smallest of quantities.

Conveyors Aid Packing —Help Retain Quality

By M. E. BRIDSTON
Port Blakely, Wash.

Belts and chutes of special design cut time between processing and sealing of packages, thus assuring freshness of product

WITH the labor situation already tight, and with every prospect of its growing tighter, the food manufacturer has a great incentive to utilize conveyors and other labor-saving equipment to the fullest possible extent. And when the improved speed of handling that follows the installation of conveying equipment results in improved product quality through greater speed of packing, as was the case at the plant of Williams & Co., Seattle, Wash., the manufacturer has a double benefit.

An automatic packaging installation was recently made at this plant, in the potato chip department, with the result that the chips are sealed in the protective glassine bags much more quickly than was the case when packing was done by hand. Thus they reach the consumer in fresher condition than formerly.

The new installation starts at the frying vats, where the chips, as removed from the vats, are spread on a stainless steel conveyor 24 in. wide, operating at 5 ft. per minute. They move on this conveyor past the salting station, where salt is added, and are given a preliminary inspection while in transit. Here the imperfectly browned, or overbrowned, chips are removed.

Next, the 24-in. belt discharges to a 6-in. inclined stainless steel conveyor, provided with cleats and operating at 40 ft. per minute. This conveyor moves the chips to the packing room on the floor above.

Here the chips are discharged from the elevating belt onto a horizontal stainless steel mesh conveyor belt, 30 in. wide, moving at 5 ft. per minute. This serves to sift out any fines. The mesh belt, in turn, discharges to a three-way chute system which serves either or both of the two automatic packaging machines and the bulk packaging unit, as desired.

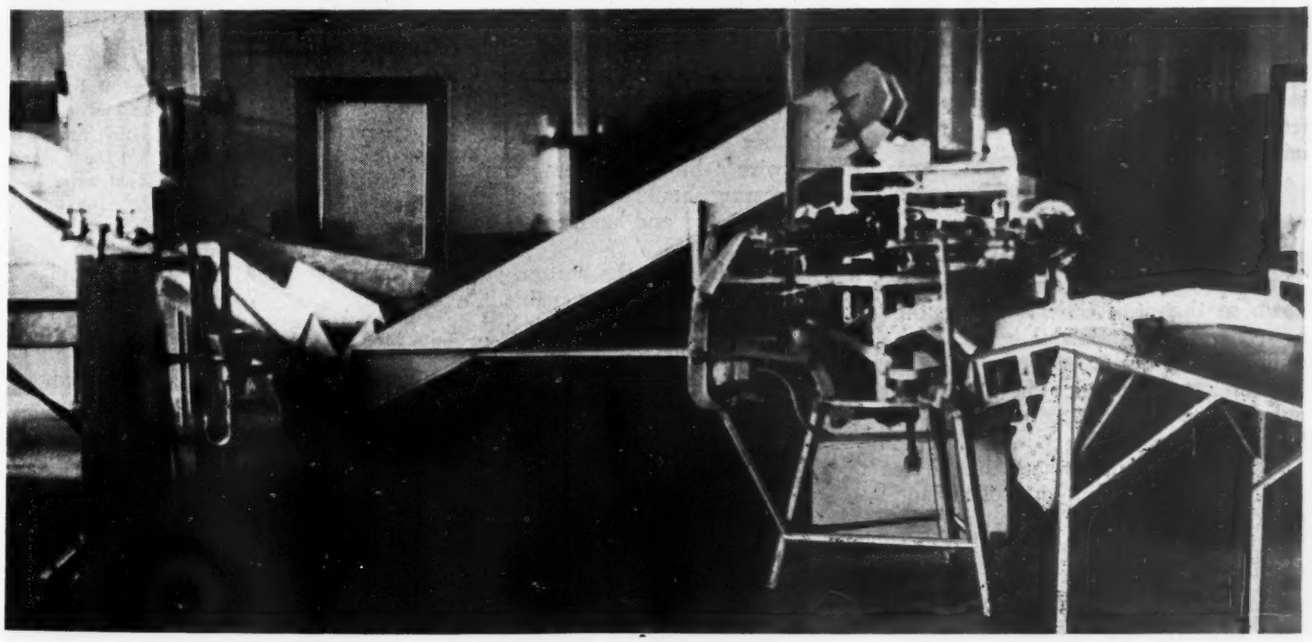
Inspection Simplified

Final inspection occurs while the chips are on the mesh belt, which is lighted by a daylight fluorescent lighting unit. Only one inspector is needed at this point, compared to the former system, in which each of the girls who packaged the chips by hand did her own inspecting, thus greatly slowing up her work.

The inspector also controls the chute destination of the chips. And, if the chips do not move down the chutes fast enough by gravity, she momentarily turns on a vibrator, which speeds up the movement. Because the overall height of the chute unit could not be more than around 7 ft., gravity has to be aided by periodic use of this vibrator, to prevent clogging of the chutes.

The chute system was developed because potato chips will not feed from hoppers, as will most products packaged on these "Tri-Pak" automatic packaging machines. To load the chips by hand onto the feed belts, which are part of the packaging machines, would take too much labor.

As a final unit in this packaging line, there is equipment developed in the Williams plant for weighing and dating the sealed bags of potato chips. It is to be noted that, in spite of the greatly increased speed of this conveyorized packing operation, the chips have ample time, while on the belts, to cool thoroughly before packaging.



The three-way chute at the left discharges onto the feed belts of three packaging units, one of which is shown at the right. One, two or three of these machines may be fed at one time as desired.

Pointers on Selecting An Electric Hoist

By C. E. SCHIRMER

Chief Engineer, Hoist and Crane Division,
Robbins & Myers, Inc., Springfield, Ohio

Efficient food plant operation demands the use of electric hoists for many materials handling jobs. And here are some things you ought to know about this labor-saving equipment. The facts apply to food plants in general, although they are addressed to canners

SINCE electric hoists are so universally used in efficient canning plants today, canning plant managers ought to know what is required in a satisfactory hoist installation. The factors to be considered will be discussed one by one.

Capacity

The capacity most frequently employed is the 1,000-lb. size. This gives an ample factor of safety for the maximum load handled. Care must be taken to prevent unbalanced loading of the basket, otherwise binding between the retort or kettle and the basket puts an increased load on the hoist.

Speed

Speeds of 20 and 30 ft. per minute are used in most retort or kettle rooms. These speeds keep the size and weight down so that it is easier to move the hoist along the monorail beam, especially where a push-type trolley is used. In most small canneries the 20 ft. per minute speed is employed, as it reduces the required motor horsepower. In some of the larger plants, where the hoists are equipped with motor trolleys and carry loads to various departments, the hoisting speed is frequently 50 ft. per minute.

Type of Control

A pendent-rope control is recommended for such a hoist because it eliminates complicated parts. The controller should have a cover which is reasonably close fitting, although it need not be "water-tight." The pendent cords should be nonmetallic so that no transient electric current can be transmitted to the operator. Wet floors make this especially important.

This controller also functions as an upper limit switch. It is interlocked with a lever which is operated by contact with the bottom block when it reaches the uppermost limit. This mechanism is also interlocked with a mechanical motor brake which stops the motor promptly to prevent drift of the hook.

Essential Parts

The hoist should be equipped with a dependable automatic mechanical load brake, located within the gear housing and run in oil. The function of this brake is to control the load in lowering. It also holds the load safely at all times when the motor is not in operation. The application of this brake is not dependent upon the operator. The automatic load brake is used in addition to the motor brake referred to in the paragraph discussing controls.

The lifting member of the hoist should be plow steel wire rope, extra flexible, six strands and 37 wires per strand, with a lubricated hemp center.

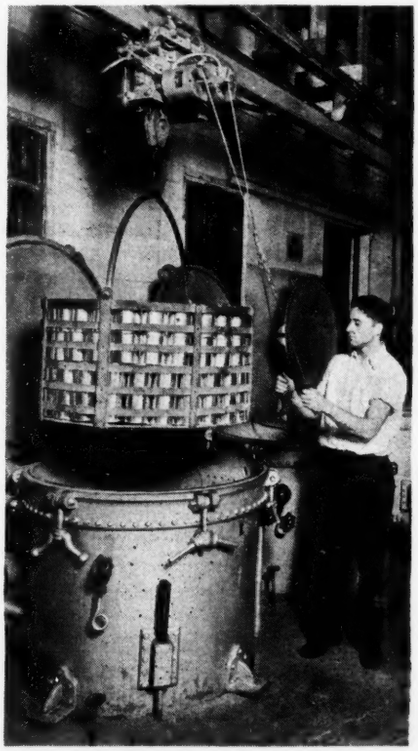
The gearing should be made of alloy steel heat treated and hardened to give maximum life.

The hoist hook in the bottom block is made of special shape to enable it to easily engage and disengage the bail of the basket container.

The motor should be of the totally enclosed type, with windings especially treated to resist the dampness existing in all canning plants. Squirrel-cage motors are more desirable for this service than any other type. This type of motor can be operated only on polyphase current.

Monorail Track

The arrangement of the monorail track depends, of course, upon the most desirable layout of the retorts with respect to the overall processing scheme. Some plants use a straight line of retorts. This needs only one straight monorail overhead. Other arrangements include the U-shaped or open loop, and yet another, the complete or closed loop. Where the open loop arrangement of retorts is employed, it is generally desirable to run the overhead monorail in a closed loop so that the hoist can be returned to its starting point without back tracking. The radius of any curves in a monorail system should be not less than 5 ft. A larger radius is advisable to reduce the effort required to move the hoist around the curves.



Pendent-rope-operated electric hoist serving one line of retorts. The monorail beam is straight and paralleling it are three open copper conductor wires. This hoist is equipped with a trolley that is pushed along the beam. It is the least expensive type of hoist installation.

To get current to the hoist, conductors are required alongside of the track. For straight track, No. 4 B&S gage hard-drawn round copper wire has proved very acceptable. Supports should not be more than 20 ft. apart. For curved track use 1½x¼-in. flat steel bars, spacing the supports not more than 4 ft. apart. A spring actuated take-up reel for the main line conductor cable can be used instead of open wiring, but the cost is considerably greater.

A ground wire ought to be provided between the track and the ground to protect the operator against shock.

Push Type or Motor Driven?

Whether to use the push-type hoist or a motor-driven one depends upon the amount of work the hoist must do. In small canneries the plain push-type, ball-bearing trolley has been universally selected. It is inexpensive and is easy to operate if the distances are not too great.

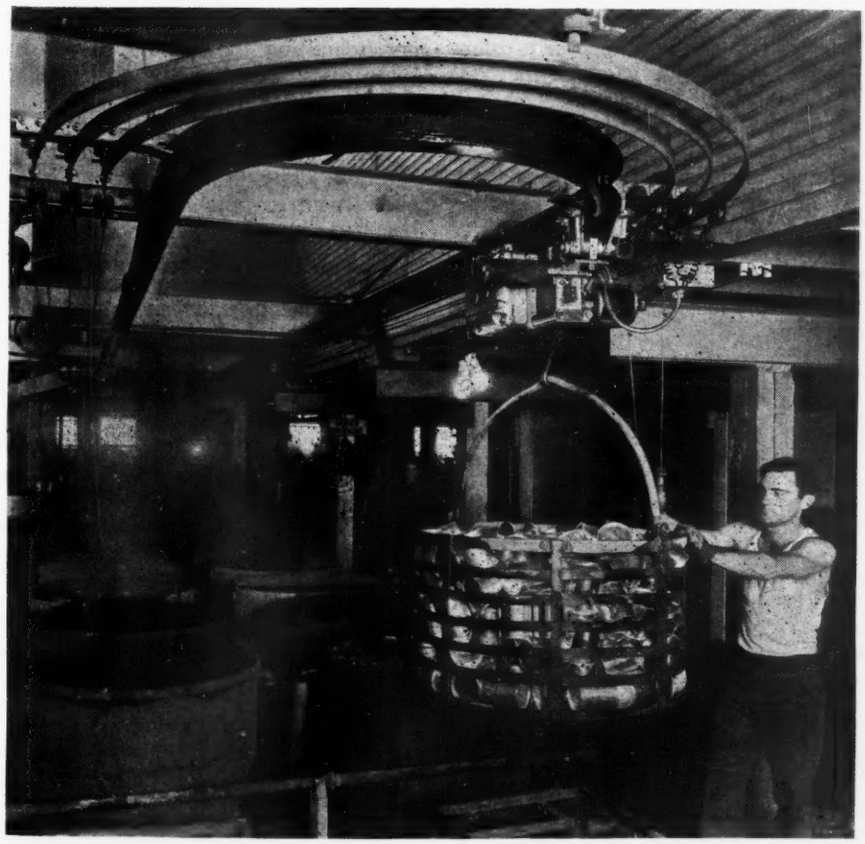
In larger canneries where many retorts must be served, or where the track system is correlated with other departments, the motor-driven hoist is desirable. Often several such hoists are in use on the same monorail system. This permits successive operations to be carried on simultaneously, giving a steady flow of production and keeping costs of handling at a minimum.

Electrical Characteristics

Polyphase current is generally available and should be used for hoists. This permits the use of high-torque squirrel-cage induction motors. These motors have no brushes or commutator, requiring less maintenance. They have high efficiency, greater overload capacity and low operating cost. A totally enclosed motor is advisable.

Single-phase hoist motors are available, but they are not as desirable as two-or three-phase motors. Single-phase motors generally have a centrifugal mechanism to switch the curent from the "start" winding to the "run" winding. Obviously, such motors have a higher maintenance cost. Power companies generally place a limit on the horsepower of motors used on single-phase circuits. Dimming of lights is liable to occur when motors are driven from single-phase lighting circuits.

Hoist installation in a large eastern canning plant. The track system consists of several looped tracks. Some parts of this system, not shown, are connected with tracks going to other departments. All the hoists shown have motor driven trolleys to secure rapid handling of loads over greater distances.



Hoist operating on a looped runway beam. Flat steel bars are used as current conductors on the curved part of the beam.

A main-line, enclosed safety switch ought to be provided in the circuit feeding current to the hoist conductors. This enables the maintenance man to shut off all current for the hoist conductor system when repairs are necessary. Also, it is a good practice to open such a main-line switch after the day's run to prevent tampering with hoist controls. Unauthorized persons often have damaged hoisting equipment after working hours by tampering with the controls.

Other Uses

To speed up general production and reduce costs, electric hoists often can be used in departments other than the retort or kettle room, including the warehouse and the machine shop or maintenance department. They can also be employed for operating freight elevators, for loading or unloading trucks or cars and for transferring materials or supplies between departments.

Look After Your Labelers—Here's How

By SIDNEY T. CARTER,
Chief Engineer, Economic Machinery Co., Worcester, Mass.

By now no one needs reminding that new labelers are hard to come by. But many are not fully aware of the precautions necessary to keep 'em rolling. That the author tells you

EVERY labeler deserves a good clean-up after a good day's work. There's bound to be more or less accumulation of broken glass, some of it perhaps ground into fine particles, scraps and fiber from cartons, contents of broken packages and excess glue that may have been spilled around the machine. Almost all of this can be cleaned up with the usual scraper and air hose, taking pains not to blow dirt into bearings and cams. Labelers that are on the job every day should have all bearings and moving parts thoroughly sprayed at least once a month. An ordinary spray gun using carbon tetrachloride or some other suitable cleaning fluid will quickly get rid of excessive grease and dirt. Remember, however, that every time a machine is sprayed and cleaned in this way *it should be thoroughly greased.* Otherwise, you are inviting trouble from possible bearing failures.

Keep 'em Well Greased

Labelers should be thoroughly greased at the end of each day's run, using the lubricant recommended by the manufacturer. There are, of course, some bearings, such as motor bearings, ball bearings for drives and slow-speed shafts, which do not call for daily lubrication. And it is up to the boss to see that the man who does the job is properly informed, as some types of bearings are harmed rather than helped if too much lubricant is applied.

Make Regular Inspections

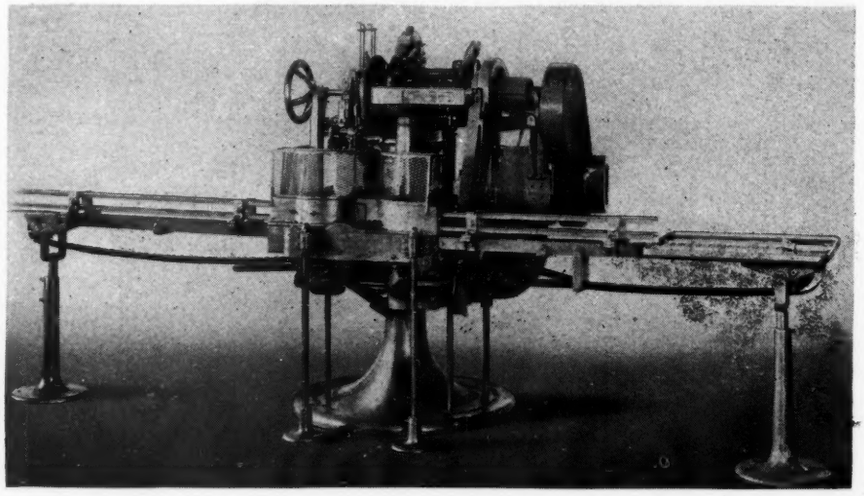
A well-trained maintenance man should check all moving parts on each labeler at regular intervals, depending on the number of hours the machine operates during a given period. During these check-ups he can readily determine whether or not moving parts show signs of wear and whether they are being properly lubricated. This will definitely minimize the number of breakdowns.

Suppose, for example, there is a failure at one of the bearings supporting a shaft. This may be due to improper lubrication or by accidental spilling of the contents of the packages going through the machine, which may be of such nature as to dissolve the lubricant. It might also be caused by adhesive getting into the bearing. The feature of this one bearing, if it is allowed to continue to operate, will eventually cause the other bearings to fail and may result in a major breakdown. But if the trouble is corrected promptly after the first bearing failure, the machine will be kept in service. The time to avoid trouble is when a single part needs attention, not the whole machine.

Remember that adhesives are definitely poor lubricants. Keep the glue in the glue pot. Don't let it slop over and ooze its way into bearings.

In ordinary times the thing to do would be to throw away worn parts and install new ones. Today it is better to make minor repairs in your own shop if possible. The engineer in charge will know whether this is feasible or whether it would invite more serious trouble. For example, a worn shaft can be fixed by turning down the diameter and rebushing the bearing to fit. In some cases, however, the shaft might fail if reduced in diameter. It takes some engineering judgment.

Cams need careful and regular inspection. The usual procedure is to allow them to function until they become so worn that they no longer perform the required service, then replace them with new ones. However, all cams if not worn too badly can be recut and

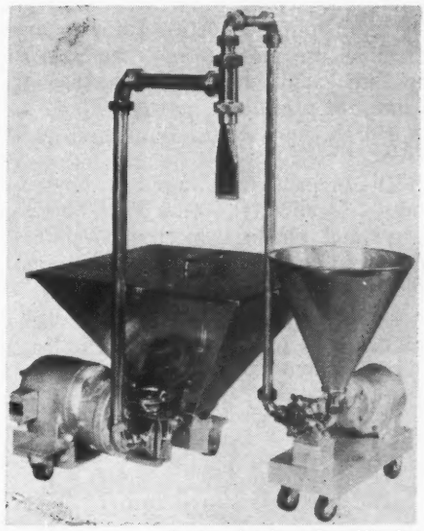


An automatic rotary labeler of a type used in many food plants where products are packed in glass. Labelers will last a long time if given the care outlined in this article.

will again give perfect performance. Using cams over again in this way not only gets around the problem of obtaining new metal castings but also saves machining time which is now so much in demand for war work.

Don't Run 'em Too Fast

Heavy though the demands for greater production may be, it doesn't pay to run your labeler faster than the speed recommended by the manufacturer. If your production schedule permits, running the labeler at 80 to 90 percent of its maximum speed will add materially to its useful life. A labeler occasionally can be run at a speed greater than its rating, but if excessive speed is kept up the life of the machine is correspondingly limited.



Courtesy of Anderson Bros. Mfg. Co.

Equipment for introducing fruit purees into ice cream. The pump on the left is used for ice cream and the one on the right for puree. The product as discharged from the nozzle is variegated. Where a continuous freezer is used, only the pump for puree is required.

Using Fruit Purées To Get New Flavors In Ribbon Ice Cream

By DONALD K. TRESSLER
New York State Agricultural Experiment Station, Geneva, N. Y.

Pectinized fruit purees used in variegated ice creams make possible many unusual fruit flavors. Each of the purees described in this paper has been successfully used in experimental batches of ice cream and several are already in commercial use

THE advent of ribbon, revel, royale or marble ice creams has been one of the most noteworthy innovations in ice cream making of the past decade. It has not only added a new type of ice cream, but has also made possible the use of many new fruits and specially prepared fruit products in flavoring ice cream. For instance, highly acid fruits, which will not make desirable ice creams of the standard kind, may be used in the manufacture of ribbon ice creams. Examples of such fruits are plums, currants, cranberries, sour cherries and blackberries. Orange, peach and other marmalades may also be successfully used in making the new type of ice cream.

Another great advantage is that a given amount of fruit is more noticeable in a ribbon than in a regular fruit ice cream. It has always been difficult to make a peach ice cream of noticeable flavor and color without adding synthetic flavor and artificial color. When peaches of the right variety are employed in making ribbon ice cream, the peach color and flavor are easily noted even though the amount of fruit used is not great.

A pectinized fruit purée of the best quality for use in ribbon ice cream must have pronounced flavor and color but it should not be too sweet; it should yield a frozen product of smooth texture, and must have a somewhat greater total solids content than the ice cream in which it is used, so that it will not be hard in the ice cream. Further, it should possess a heavy body so that it will not run out of the ice cream when it melts. The body of the purée should be heavy enough and the purée itself should be cold enough (40 deg. F.) so that it will not mix with the soft ice cream when introduced at the freezer. The ice cream, on the other hand, should be firm enough to keep the purée from settling.

A total solids content ten percent higher than that of the ice cream will give a purée which will be as soft, or softer, than the ice cream. If straight sucrose is used as the sweetening agent, the purée will not only be too sweet but, when frozen, may become somewhat sandy because of the crystallization of the sugar. Replacement of half of the sucrose with a corn sirup of high sugar content, such as enzyme-converted corn sirup,[1] will take the "edge" off the sweetness and also will cause the formation of very much smaller sugar crystals, because of the mixture of sugars present and the action of the protective colloid, dextrine, of the corn sirup.

Enzyme-converted corn sirup is greatly superior to ordinary corn sirup (c.s.u.) for use in making pectinized purées.

It contains approximately twice the sugar content and only one-half as much dextrine as the c.s.u. grade of corn sirup. For this reason it is about twice as sweet and is much less viscous than c.s.u. It has none of the bitter "hydrol" flavor characteristic of most of the high-conversion corn sirups. Further, it is lacking in the gumminess noted in low-conversion corn sirups. Its use makes easy the introduction of the pectin into the purée and makes unnecessary the heating of the purée in order to get a smooth consistency.

The addition of pectin to the purée is advantageous both because of its action as a protective colloid in causing the formation of small crystals, and the increased body which it gives, thus enabling the purée to retain a soft jelly-like consistency when it melts.

Most of the ice cream makers prefer a tart purée; this can be obtained by the addition of a little citric acid. The added citric acid increases the vis-

[1] The enzyme-converted corn sirup called "Sweetose," manufactured by the A. E. Staley Mfg. Co., Decatur, Ill., was used in the laboratory and commercial experiments on which this article is based.

cosity and jelling properties owing to its action on the pectin. Some manufacturers use phosphoric or malic acid as these acids are more effective in jelling the pectin.

Berry Puree

The preparation of raspberry, boysenberry, loganberry, youngberry, blackberry and blueberry pectinized purées is a relatively simple matter. A tested recipe is presented below:

Pulpy fruit juice or purée	100	lb.
Granulated sugar	50	lb.
Enzyme-converted corn sirup (43 deg. Bé.)	60	lb.
Pectin[2] (110 grade)	2	lb.
Citric acid[3]	1.5	lb.
Water	20	lb.

The pectin is stirred into 15 lb. of the enzyme-converted corn sirup, which has previously been warmed to about 160 deg. F. This suspension of pectin in corn sirup is then slowly stirred into the water which has been brought just to the boiling point. The solution is agitated rapidly and kept hot for 5 to 10 minutes, or until a smooth sirupy solution is obtained. Heating is then discontinued, and while the agitation is continued the remainder of the enzyme-converted corn sirup is added. The fruit purée, to which has been previously added the granulated sugar and finely powdered citric acid, is then stirred with rapid agitation into the solution of the pectin in the corn sirup.

The product may be heated to 170 deg. F. and then canned without cooling, or it may be cooled for immediate use or for freezing preservation. If the purée is canned, it should be filled into cans lined with special fruit enamel, taking care to fill each can completely. The cans are closed immediately, then they are inverted or turned on the side in order to sterilize the covers. After standing for five minutes, they are cooled in running water.

If the purée is to be used immediately or frozen for future use it should be cooled, under slow agitation, by running water in the jacket of the kettle in which it was made. If the purée is to be preserved by freezing, it should be cooled as cold as possible in the kettle and then run into 30- or 50-lb. enamel-lined slip-cover cans and frozen at 0 deg. F. or lower.

The total soluble solids content of the product will be approximately 50 percent.

The machine employed for converting the berries into purée should be one which will not beat in too much air. The tapered screw type[4] extractor commonly used for making tomato juice is suitable for the purpose. If the pectinized purée is to be frozen, it is advisable to deaerate it prior to combining it with the pectinized enzyme-converted corn sirup and sugar solution.

Either fresh or frozen fruit may be used for making the purée. As a rule, fresh fruit gives a product of slightly superior color and flavor. But if fruit that has been quickly frozen in 30- or 50-lb. cans is rapidly thawed and then immediately converted into purée, an excellent product can be made from frozen fruit.

If sugared berries are used, the amount of granulated sugar in the formula should be reduced to allow for that contained in the fruit, and the amount of fruit increased to make up for the dilution caused by the presence of the sugar. Thus, if 2 + 1 berries are used, 150 lb. of the purée prepared therefrom will contain approximately 50 lb. of sugar and 100 lb. of pulpy fruit juice. This amount of purée should be used in the formula without the addition of any more granulated sugar. In 133⅓ lb. of purée from fruit packed 3 + 1 there are 100 lb. of actual fruit and juice and 33⅓ lb. of sugar. To this quantity should be added only 16⅔ lb. of granulated sugar.

The Cuthbert and Viking varieties of red raspberries and the Columbian, Sodus and Marion varieties of purple raspberries have pronounced flavors and yield excellent purées.

The same formula and procedure can be used in making pectinized strawberry purée, except that berries which have been ground in a special food chopper should be used instead of a seedless purée. Strawberry varieties which yield especially good purées include the following: Oregon, Marshall, Redheart, Klondike, Van-Rouge and Missionary.

Peach, Nectarine and Apricot Purees

The problem of making a pectinized purée from Elberta, or a similar variety of peaches which browns easily, is more difficult since sufficient oxygen is introduced in the comminution process to cause rapid browning unless the oxidative enzymes are in some way inactivated.

The following formula and procedure yields a very good product which does not discolor during long continued cold storage:

Ground peaches	100	lb.
Granulated sugar	50	lb.
Enzyme-converted corn sirup (43 deg. Bé.)	60	lb.
Pectin	2.5	lb.
Citric acid	1.25	lb.
Water	20	lb.

The solution of the pectin in the enzyme-converted corn sirup is obtained in exactly the same manner as described above under pectinized berry purée. In this case the solution is raised to and maintained at 175 deg. F. The peaches are peeled either by scalding in boiling water or steam for about 90 seconds or by immersion in hot lye solution.

After the peels have been rubbed off, the peaches are halved and the pits removed. The halved peaches are placed in the hopper of a food chopper, especially arranged to grind soft fruits, or in a similar grinding device, sprinkled with some of the sugar and some citric acid solution prepared by dissolving the citric acid in a small amount of water. As fast as the peaches are ground, they are stirred directly into the pectin-corn sirup solution, which is maintained steadily at 175 deg. F. When the proper weight of ground peaches has been added, any remaining sugar and citric acid is stirred into the batch. Then the pectinized purée is cooled by circulating cold water in the jacket of the kettle.

The peach purée may be canned or frozen for future use in exactly the same manner as described above for berry purées.

The Hale Haven, South Haven, Veefreeze and J. H. Hale varieties of peaches yield especially desirable pectinized purées. Other varieties of peaches which give a very good product are the following: Elberta, Ideal, Massasoit, Marigold, Vedette, Veteran, Viceroy, Eclipse, Oriole, Rio Oso Gem and Sunbeam.

Pectinized nectarine and apricot purées may be prepared according to the procedure described for peaches. Mixtures of peach and nectarine purées and peach and apricot purées are even more inviting than the straight product. Straight peach purée does not have a particularly potent flavor and color. The addition of either nectarine or apricot purée strengthens both the flavor and color.

Currant Puree

Pulpy current juice	100	lb.
Granulated sugar	50	lb.
Enzyme-converted corn sirup	60	lb.
Pectin, 100 grade	1	lb.
Water	20	lb.

Currant juice is so tart that no citric acid need be used. The method to be followed in making pectinized currant

[2] Less pectin is required for black raspberry puree. One pound per 100 lb. of fruit will be sufficient.

[3] The more tart the fruit, the less citric acid should be added. Thus little, if any, citric acid needs to be used in making loganberry puree.

[4] Manufactured by the Chisholm Ryder Co., Niagara Falls, N. Y.

purée is the same as that described for berry purées. This product has a deep red color and pronounced flavor. It is worth a trial.

Pineapple Puree

Canned crushed pineapple	100	lb.
Granulated sugar	45	lb.
Enzyme-converted corn sirup	60	lb.
Pectin, 100 grade	2.5	lb.
Citric acid	1.5	lb.

First the crushed pineapple should be disintegrated. The pulpy product is combined with the sugar, sirup and pectin by the procedure described under berry purées. A suitable color should be added, as otherwise the product is scarcely noticeable in the ice cream.

Grape Puree

Concord grape juice	100	lb.
Granulated sugar	50	lb.
Enzyme-converted corn sirup	60	lb.
Pectin (100 grade)	2	lb.
Citric acid	1.5	lb.
Water	20	lb.

The method of making this product is the same as that described for berry purées, the Concord grape juice being substituted for the pulpy fruit juice. The product has an excellent color and a pronounced flavor and consequently yields an excellent variegated ice cream.

Damson Plum Puree

Damson plums frozen with sugar (3+1)	100	lb.
Granulated sugar	12.5	lb.
Enzyme-converted corn sirup	45	lb.
Pectin (100 grade)	1	lb.
Water	15	lb.

The thawed plums should be converted into a purée in a tomato juice extractor of the tapered screw type. The resultant purée is combined with the sugar, corn sirup, and pectin according to the manner described under berry purées. Damson plums are so tart that no acid need be added. The product has a pronounced color and flavor and is recommended for trial.

Cherry Purees

Neither Montmorency nor the common sweet cherries, such as the Black Tartarian and the Napoleon, possess sufficient flavor to give an especially desirable pectinized purée for use in ice cream. However, highly flavored and colored products can be obtained by using the English Morello variety either straight or mixed 50-50 with Montmorency cherries. An interesting product can also be prepared by mixing comminuted Maraschino cherries in cherry juice. The formulas for these purées follow:

English Morello Cherry Puree

English Morello cherry purée	100	lb.
Granulated sugar	50	lb.
Enzyme-converted corn sirup	60	lb.
Pectin (100 grade)	2.5	lb.
Water	25	lb.

English Morello cherries usually are so acid that no citric acid need be used. Either fresh or frozen cherries can be used. If fresh cherries are used, they should be pitted and then heated to 150 deg. F. before they are converted into a purée in a tomato juice extractor. Frozen cherries may be thawed and then put through a tomato juicer without heating. The method of combining the purée with the sugar, corn sirup and pectin is the same as that described under Berry Purées.

Maraschino Cherry Puree

The Maraschino cherries should be pulped in a suitable machine which

(Turn to page 99)

How To Get the Most Out of Belt Drives

By J. R. HOPKINS
Chicago Belting Co., Chicago, Ill.

Faced with the necessity of operating at capacity during the war, with little or no chance of obtaining additional equipment, food manufacturers will greatly benefit from following the simple rules set down here for the care of leather belts and V-belts

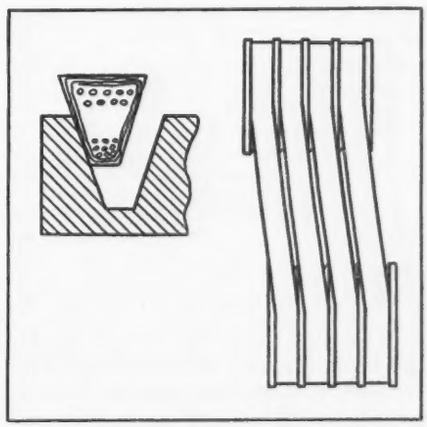
WHILE many machines in the food industries operate 24 hours per day with fixed loads and have the motors direct connected, yet this industry also uses an enormous number of belt drives. These cover about the entire range of power transmission problems.

Fortunately, both leather belts and V-belts obey a few simple laws and it is not difficult to make certain that your driven machines have the proper belt drive to assure continuous and dependable operation without any belt trouble. Both leather belt and the V-belt applications are covered by excellent engineering data books, issued to make it easy for plant engineers and millwrights to design and specify the drives their machines require.

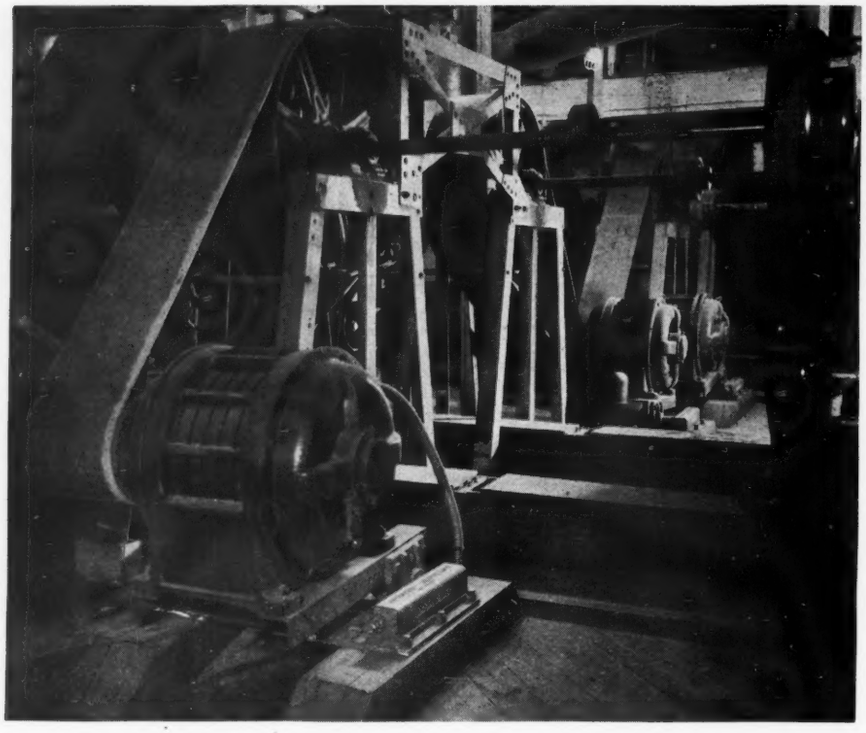
Below are a few basic rules that are definite laws and must be observed. One set of rules covers flat leather belts and another set covers multiple V-belts.

How to Get the Most Out of Leather Belts

1. *Keep the belts dressed.* Leather belts *must* be kept dressed—to prevent their fibers drying out. And keep them *clean*. Dress with good leather belt dressing every three months for ordinary conditions—every month or every week where air is dusty, very dry or where belts are overloaded. To clean a belt wipe off dirt with waste dipped in gasoline, let belt dry, then dress it.



When the sheaves of a multiple V-belt drive are misaligned, the individual belts wear out quickly because they scrape on the sides of the grooves, as shown in this sketch. The remedy is to line up both driving and driven sheaves, in both horizontal and vertical planes.



Endless leather belt drives in a cottonseed oil mill, with motors mounted on automatic belt tightening bases to give correct tension.

Naptha or carbon tetrachloride are also good belt cleaners.

2. *Make all your leather belts endless.* They last longer. And avoid fastener trouble. Your millwright can be taught how to make endless laps by your nearest belt shop. Or your belt supplier will do it for you. If you have many leather belts buy clamps and rods and ask for book of instructions. Then you can make belts endless on the pulleys.

3. *Be sure your belt thickness is correct for pulley diameter.* Minimum pulley diameters for leather belts of different thicknesses are shown in the table. Do not use on pulley smaller than in this table or you will have trouble.

	Single Ply		Double Ply			Triple Ply	
	Med.	Heavy	Light	Med.	Heavy	Med.	Heavy
These are the minimum recommended pulley diameters for the above thickness belts							
Belts under 8 in. wide....	3″	5″	6″	8″	12″	...	...
Belts 8 in. and wider....	..	..	8″	10″	14″	24″	30″

4. *Be sure your belt is right size for the load.* To have belt driven machinery work properly the machine must be provided with enough continuous and dependable power to handle all peak loads—no matter how frequent or severe the loads are. This means the full power of the motor or the lineshaft must reach the driven machine through the belt *and you must provide enough belt for this purpose.*

Lineshaft Belts and Long Center Drive Belts

If any such driven machine does not work perfectly first check the belt size. Ask any belt maker for the American Leather Belting Association 1939 horsepower table. Check the width and thickness of your belt with this table. If your trouble is real or continuous this will probably correct it.

For Short Center Leather Belt Drives From Electric Motors or Gas Engines

Short center leather belt drives are recommended only with an automatic belt tightening motor base (pivoted motor base) used in place of motor slide rails. With these bases the leather belt is very efficient, the belts last a long time and there is practically no drive maintenance required.

Ask your belt supplier for a *Short Center Leather Belt Drive Data Book.* Gives complete tables so you can quickly and easily check any short center leather belt drive. Is very complete and dependable.

B. *Be sure you have large enough pulleys* to keep the belt speeds up. Doubling the belt speed doubles the horsepower that a belt will transmit or cuts in half the stress in the belt for the same horsepower. *Be sure that your motor pulley is not smaller than the diameter recommended by motor manufacturer.* Nearly all unsatisfactory drives get that way because the small pulley is too small. See table for minimum diameters for NEMA motors.

Use the Short Center Leather Belt Drive Data Book as your *bible.* If you do, every such drive will be satisfactory, the drives will require scarcely any maintenance and the belt life will be very long.

If it ever develops that you have to change over a V-belt drive to a leather belt drive this data book tells everything you need to know, installation is easy and can be done quickly.

How To Get the Most Out of V-belt Drives

1. In designing new installations always use larger sheaves than minimum recommended and use an extra belt or two above the minimum number recommended. Additional material and cost are offset by considerably longer life.

2. Be sure to purchase *matched sets* of belts so that each belt will carry its full share of the load.

3. Don't force or pry the belts over the sides of grooves. Slide motor forward to put the belts on and then slide back to give tension. Better yet, use a pivoted motor base under the motor and belts will go on easily and always be at the right tension when running.

4. Proper alignment of sheaves is very important to long V-belt life. Be sure the sheaves are lined up in both horizontal and vertical planes. If a multiple V-belt drive is misaligned, a little reflection will show that the ropes are scraping down one side of the grooves as they enter the driven pulley and similarly scraping down the other side of the grooves where they enter the driver.

This constant scraping action will tend greatly to reduce the rope life. The drive should be realigned at once.

5. *Keep V-belts tight*—V-belts need correct tension, the same as other belt drives. If no pivoted base is used, check tension 36 hours after original installation and at frequent intervals thereafter check to make sure that belts have live, springy vibration when struck by hand.

6. Check sheave grooves to make sure they are smooth and not worn out of shape. If they are worn, replace with new sheave.

7. *Keep V-belt clean,* free from dirt, grease and oil. No belt dressing is necessary. Just wipe with cloth or waste dipped in gasoline.

8. Never replace part of a set of V-belts with new ones. Replace the whole set with new V-belts and save the old ones for spares to be used with other old ones.

Demethylated Pectins Offer Advantage In Low-Sugar Jellies*

By GEORGE L. BAKER and
MARVIN W. GOODWIN
Delaware Agricultural Experiment Station, Newark, Del.

Jelly with 40 or 50 percent soluble solids can be made without loss of jelly strength by using low-methoxyl pectins but would require greatly increased amounts of pectin, or very low pH, with high-methoxyl pectins

WAR conditions have brought about an increased demand for pectin, both for Lease-Lend purposes and for use as a substitute for several colloidal materials imported in the past. This demand has been countered by rapid expansion of pectin-producing facilities. In view of the possible necessity or desirability of cutting down on the sugar content of certain jellied products, it was thought of interest to the jelly trade to present a resumé of the pectin requirements of jellies containing less than the usual 65 percent soluble solids.

It is well known that upon decreasing the solids content of pectin jellies an increase in the amount of ordinary commercial pectin is necessary in order to maintain desired firmness, but it has been found that where low-methoxyl pectins (intermediate pectinic acids) are used as the jellying agent, only slight changes in pectin content are required to maintain a uniform jelly strength as sugar solids are lowered.

One qualifying warning must be given—ample allowance must be made by both the canner and the consumer for proper preservation of products of lowered sugar content. The preservative action obtained with a 65 percent soluble solids content is lost in jellies containing only 40 and 50 percent soluble solids. Within the past two years workers[1,2] at the Michigan Agricultural Experiment Station have published results of studies which point out the preservative action of various acid and sugar combinations. For instance, dextrose[1] is shown to exert an inhibitive effect upon the growth of organisms in concentrations as low as 30 to 40 percent, and acid[2] is considered the more important factor in preservative action in sugar-acid combinations. This latter effect may be noted in a product such as cranberry sauce where increased acidity partly compensates for lower sugar content in preservative action. Sweetness will be lost but this can be partially offset by allowing more invert sugar to be present.

Another factor aiding preservation of these lowered sugar pectin jellies is greater fluidity while in the hot stage. Low gel melting points and greater fluidity at lower than usual temperatures are characteristic of pectinic acid jellies. This greater fluidity allows more uniform heating throughout a finished product and also longer heating periods, thus providing a better opportunity for a sterile product. Maintenance of a temperature of 160 deg. F. for 10 minutes is ample to minimize danger of spoilage from molds.

Delaware Agricultural Experiment Station Bulletin No. 234 discusses the effect of demethylation upon the jellying properties of pectin as demonstrated in 65 percent soluble solids sugar jel-

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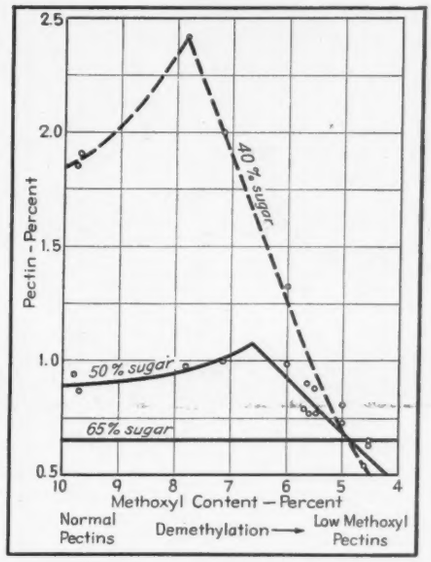


FIG. 1. Concentration of pectin in percent necessary to form jellies with a gel strength of 50-cm. water pressure, with sugar contents of 40, 50 and 65 percent soluble solids

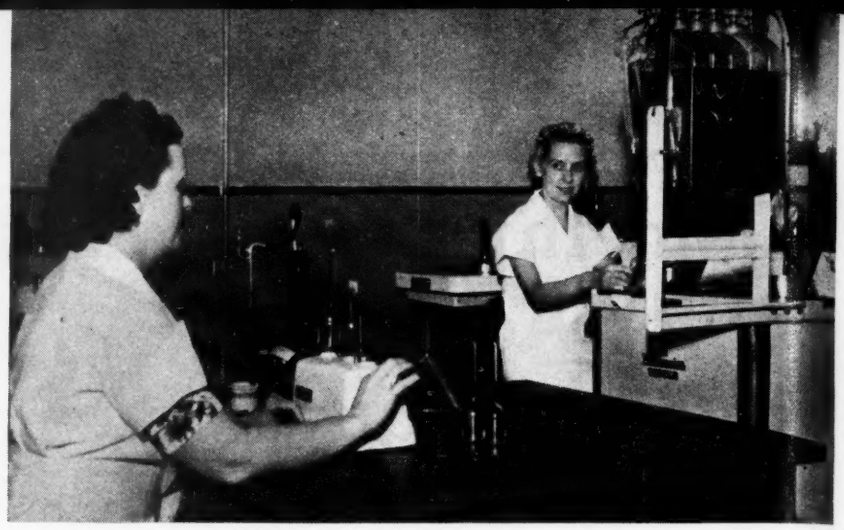
* Published with the approval of George L. Schuster, director, Delaware Agricultural Experiment Station.

TABLE I—Pectin Concentrations for Jellies of Equal Strength with Sugar Solids Contents of 40, 50 and 65 Percent. Calcium Requirements, Optimum pH, and Setting Times Indicated.

No.	Methoxyl content (percent)	Grade (Basis 50 cm. water, 65 percent sugar)	65 Percent Sugar Solids				50 Percent Sugar Solids				40 Percent Sugar Solids			
			Am't of 100 grade pectin required (percent)	Optimum calcium required by jelly (percent)	Optimum pH for calcium and pectin used	Time of set (min.)	Am't of 100 grade pectin required (percent)	Optimum calcium required by jelly (percent)	Optimum pH for calcium and pectin used	Time of set (min.)	Am't of 100 grade pectin required (percent)	Optimum calcium required by jelly (percent)	Optimum pH for calcium and pectin used	Time of set (min.)
1	9.80	140	0.65	0	3.3	2	0.94	0	2.9	60	1.86	0	2.0	90
2	9.72	190	0.65	0	3.5	20	0.88	0	2.6	50	1.90	0.003	2.0	60
3	7.78	220	0.65	0	3.0	45	0.97	0	2.4	120	2.42	0.006	1.9	360+
4	7.15	500	0.65	0	2.9	20	1.00	0.003	2.1	55	2.00	0.012	1.9	360
5	6.00	200	0.65	0	2.7	10	0.99	0.002	2.7	15	1.32	0.003	2.7	20
6	5.62	280	0.65	0.030	2.7	5	0.79	0.030	2.7	40	0.90	0.040	2.7	60
7	5.54	220	0.65	0.003	2.5	1	0.78	0.012	2.5	15	0.88	0.012	2.7	30
8	5.45	210	0.65	0.016	2.1	1	0.78	0.033	2.4	20	0.78	0.100	2.4	30
9	4.98	280	0.65	0.003	2.6	2	0.73	0.007	2.7	5	0.81	0.020	2.7	15
10	4.60	210	0.65	0.005	2.5	5	0.54	0.007	2.4	20	0.54	0.010	2.4	30
11	4.51	250	0.65	0.003	2.2	1	0.63	0.007	2.6	20	0.65	0.012	2.5	20

ACKNOWLEDGMENT is due the following laboratories for their kindness in furnishing pectin samples for these experiments: Sample No. 1, National Fruit Products Co., Martinsburg, W. Va.; Sample No. 2, California Fruit Growers' Exchange, Ontario, Calif.; Samples No. 4, 9, 10 and 11, General Foods Corp., Hoboken, N. J.; Samples No. 5, 6, 7 and 8, Eastern Regional Research Laboratory, U. S. Department of Agriculture, Wyndmoor, Pa.

1 Correctness of formula and suitability of new ingredients for inclusion in mix are determined in a development laboratory headed up by a scientifically trained and production-experienced technologist.

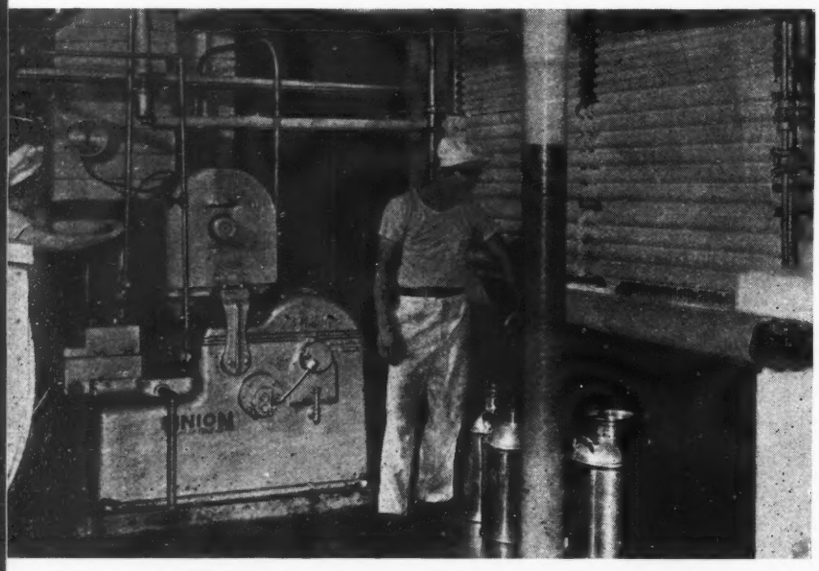


2 Checking on uniformity and composition of materials going into the ice cream mix is carried on by technicians in a plant control laboratory. The chief ingredients, cream and milk, are tested to determine butter fat content by recognized dairy industry methods.

PICTURES OF

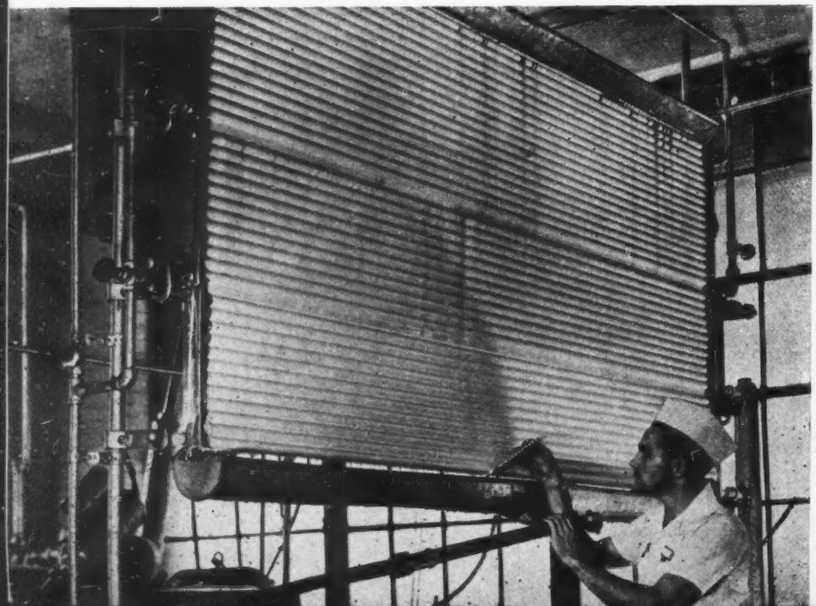
There is much more to the manufacture of ice cream control, mixing, pasteurizing, cooling, homogenizing, So there may be some ideas for other food manufac- by Swift & Co., illustrated here

Photos courtesy SWIFT & CO.

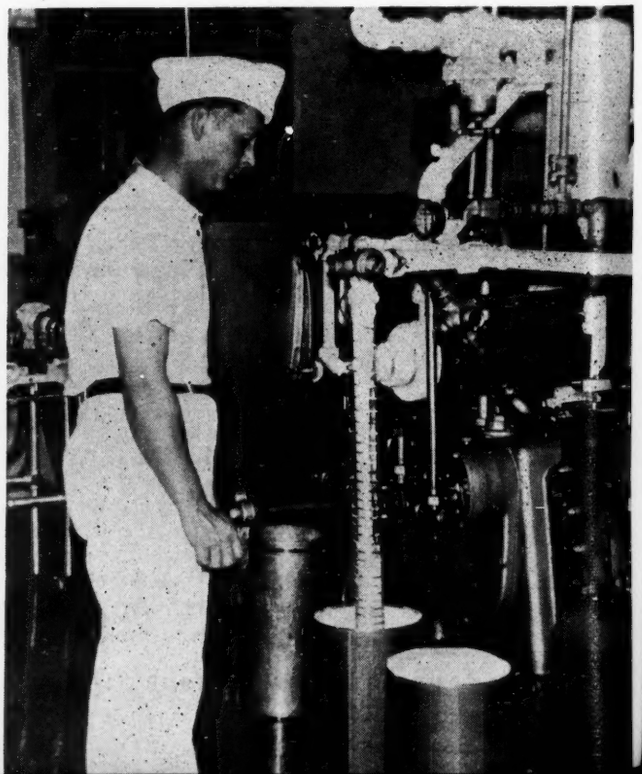


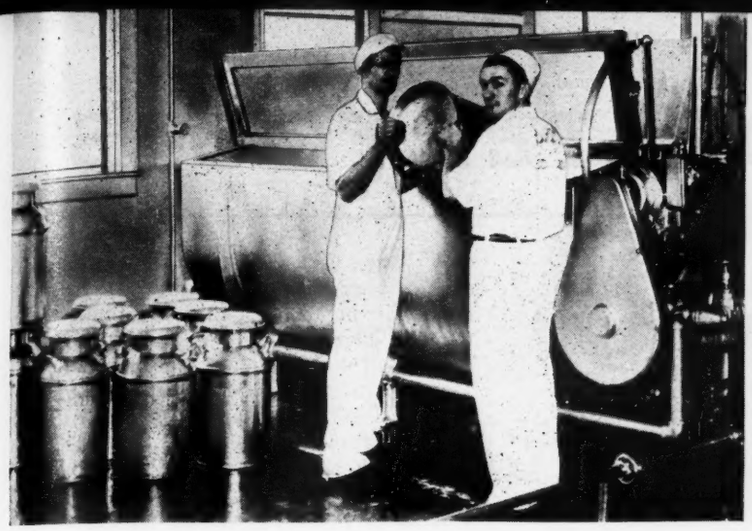
5 Following pasteurization the mix is forced under pressure through a series of baffles in a homogenizer to stabilize the dispersed solids and to break up the fat agglomerates into thousands of tiny globules.

6 From the homogenizer the 160 deg. F. mix is pumped to the distributor pan over a three-section bank of cooling coils. Through top section is pumped cold water to give gradual cooling to the hot mix. Brine is used as cooling agent in both other sections to give a 38 deg. F. mix as it leaves the cooler.

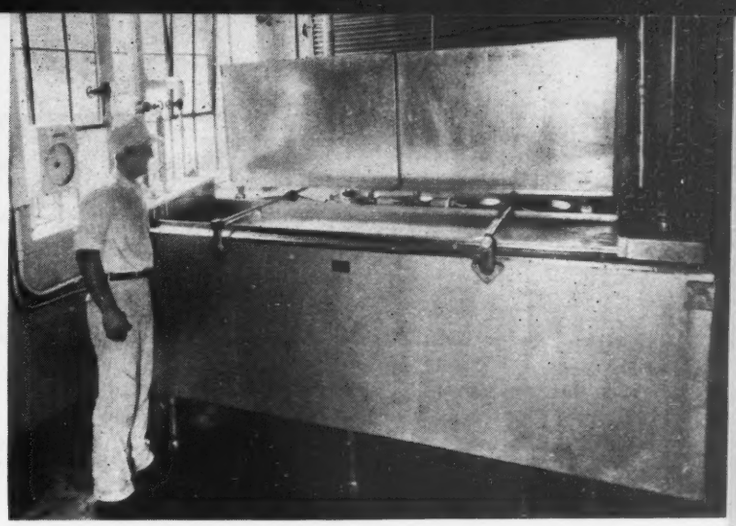


7a After a short holding period the cooled mix flows by gravity from storage vat into continuous freezer where it is whipped, aerated and given fruit and nut contents, when used, while being frozen. As delivered from freezer the mix is in heavy slush state capable of being forced into container through nozzle under spring tension to insure complete displacement of the air in the container.





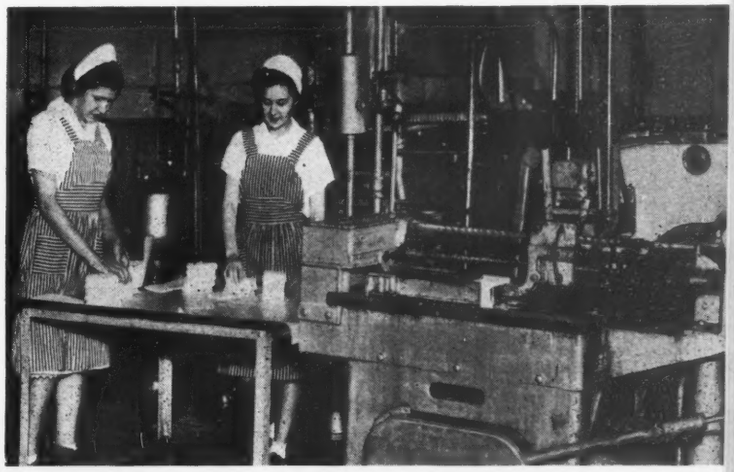
3 On the basis of information from the development and control laboratories the specified ingredients of cream, milk, sugar, flavors and other soluble or dispersible ingredients, when used, are mixed in desired proportions and, as nearly as possible, homogeneously.



4 After mixing, the ingredients are heated to and held at the pasteurizing temperature of 165 deg. F. for 30 minutes; chart of each heating period is made by a temperature-recording indicator.

PROCESSES

than freezing the mix. The process includes quality whipping, freezing, slicing, packaging and trucking. turers in the way ice cream is made and distributed



9 To supply individual serving portions, ice cream frozen in rectangular cartons is taken from hardening room, run through slicer, wrapped in moisture resistant paper (right) and returned to hardening room awaiting shipment.

8 From the freezer, the packaged ice cream goes into a sharp freezing or hardening room and is held at –20 deg. F. for at least 24 hours to assure maintenance of velvety, minute-crystal texture.

10 At end of hardening period the brick and bulk packed ice creams are checked and loaded into insulated route trucks.

7b Open - end pipe permits filling of rectangular cartons (below).

11 At each route stop the ice cream ordered is taken from truck and placed in refrigerated cabinet from which it is dispensed.

Method Developed For Grading A Dehydrated Food

By ROGER V. WILSON and
HARRY M. SLOSBERG
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While the procedure described here was worked out for spray-dried whole eggs, it is recommended in principle for dehydrated foods other than eggs. The method eliminates the individual human factor to the greatest extent possible, permitting comparable and reproducible grading

FLAVOR and nutritional value retention during storage and shipping periods has been one of the major problems connected with the production and packaging of all dehydrated foods. Their deterioration is usually the result of at least one of the following factors:

1. Oxidative changes.
2. Rancidity development.
3. Enzymic activity, frequently at a slow rate.
4. Growth of microorganisms.

When interpreted in the terms of production activities, the deterioration generally indicates:

1. Use of questionable quality raw materials.
2. Questionable production procedure.
3. Poor sanitary conditions in production plant.
4. Improper packaging.
5. Unsatisfactory storage and shipping conditions.

Under various auspices, studies are being carried on to determine conditions and procedures which are conducive to the highest retention of the inherent flavor and good eating qualities of a wide variety of foods in the dehydrated state.

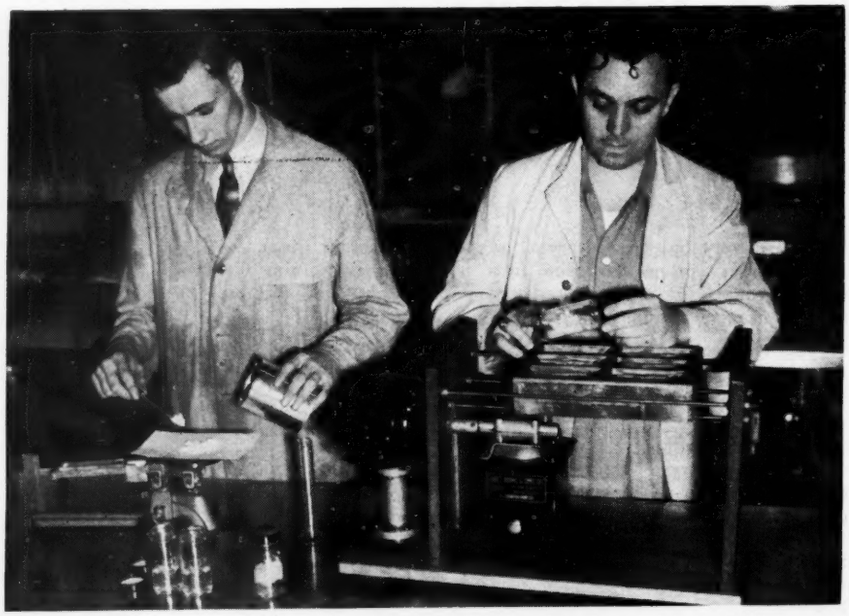


FIG. 1. Twelve grams of dried whole egg is put into a standard-size glass bottle containing 50 c.c. of distilled water and mechanically shaken for 10 to 15 minutes to reconstitute.

Important Factors

In all cases, reconstitution of the dehydrated food and the manner in which it is evaluated are important factors in judging the eating qualities of these foods. Particularly in the case of dried whole eggs the technic used is highly important. Also, the technic used has to be applicable whether the eggs are bulk packaged in 150-lb. barrels, semi-bulk packaged in 12½- to 50-lb. containers, or packaged in 5-oz. retail containers.

To that end the National Egg Products Association appointed a Scientific Packaging Subcommittee several months ago to study packaging of dried whole eggs. The members of this subcommittee are Victor Conquest, of Armour and Co.; Martin M. Kloser, of Bowman Dairy Co.; Leon D. Mink, of Swift & Co.; Lt. George Gelman, of the U.S.A. Quartermaster Subsistence Research Laboratory; and Roger V. Wilson, of Continental Can Co. Mr. Conquest and Mr. Wilson are cochairmen.

This committee has initiated a study which involves the examination of 120 samples of packaged dried eggs at monthly intervals. In addition to these samples, experimental work on dried eggs in the Continental Can Co. laboratories has necessitated the examination of many more samples. From the beginning of this study development of an accurate and reproducible method for the reconstituting and tasting of dried eggs has been counted a first essential. Also, because flavor is considered to be the prime factor, every effort has been made to eliminate other variables which might affect flavor evaluation such as the consistency, texture, color or uniformity of the cooked samples.

Development of a Reconstituting Method

In the development of the reconstituting method used by the committee several, although by no means all, of the feasible methods of reconstitution were investigated. Among those which

have been tried out before the final procedure was established are the following:

1. Making a paste of the powder with water and then diluting to the proper proportions.
2. Adding the entire amount of powder to the total amount of water and *vice versa*.
3. Varying the temperature of the water up to approximately 110 deg. F. using the preceding methods.
4. Varying the proportions of water to egg powder from the theoretical quantity present in whole eggs.

Because the examinations carried out by the committee frequently require the preparation of as many as 80 individual samples, development of a rapid method of reconstituting, which can be followed by nontechnical helpers with a minimum of supervision, is desirable. To that end the mechanical agitator shown in Fig. 1 was built. From the mechanical aspect of the reconstituting procedure, this device eliminates the human element, makes standardization possible on a controllable time and rate of operation basis, and is simple both in design and operation. It consists of a shaker rack attached to a coffee-sample grinder in such a way that the shaking device does not interfere with the original function of the grinder. The shaking device itself consists of a wooden box having six compartments, each of which holds a 2x4½-in. wide-mouth glass bottle with plastic screw cap. The box has a 4-in. travel and operates at a speed of 150 cycles per minute.

After testing several methods for preparing the samples the adopted procedure is as follows:

FIG. 2. In lots of four, reconstituted samples are cooked in a household egg poacher having small square trays supported above the level of gently boiling water.

1. Fifty cubic centimeters of distilled water is placed into each of the 2x4½-in. wide-mouth bottles.
2. Twelve grams of whole egg powder is weighed and added to the respective bottles. This ratio of water to egg powder is slightly higher than in the average whole egg. However, the texture of the finished egg is better with these proportions than when the theoretical quantities are used.
3. Six of the bottles are tightly closed, placed in the shaker tray and shaken on the machine for 10 to 15 minutes. However, for convenience each lot of six samples is left on the shaker until the next six samples are ready for shaking.

For general purposes in dried-egg tasting, this variation of 3 to 5 minutes in shaking time is of no consequence. If desired, the shaker can be operated under stop-watch control to give a specific shaking-time interval.

A significant point is that the egg powder is added to the water rather than the water to the powder. This procedure gives a better dispersion, fewer lumps in the reconstituted product, and less insoluble agglomerate than when the water is added to the powder.

When a large number of samples are being examined at one time, holding of the reconstituted samples at room temperature for several hours is necessary. Tests have indicated that this procedure produces no detectable difference in the flavor rating given the samples. In fact, tests have shown that the consistency of the cooked eggs prepared from samples which have been reconstituted and held for several hours is slightly better than that of eggs reconstituted immediately before cooking. Also, tests have shown that reconstituted samples held in a household refrigerator at approximately 40 deg. F. for 24 hours are not noticeably different from duplicate samples reconstituted immediately before cooking.

The reconstituted egg will separate to some extent after standing for several hours. This varies from a slight settling of solids to the bottom with some samples to the actual formation of separate layers in the case of dried eggs which have been stored at high temperatures. For this reason, shaking of the reconstituted samples by hand for a few seconds just prior to cooking is necessary.

Cooking the Reconstituted Eggs

After trying several methods of cooking, the best and most reproducible results were obtained by cooking the reconstituted eggs in a household egg poacher. Cooking in pans over a flame or hot plate introduces many variations in the texture as well as occasional off-flavors from scorched particles of egg. The procedure is, therefore, standardized by using the household egg poacher shown in Fig. 2. The poacher consists merely of a square aluminum pan in which four small square trays are supported above the water level. Each tray holds the equivalent of one whole egg. The eggs are cooked by steam coming from water in the poacher. The advantages of using this type of poacher are that the cooking time can be duplicated with numerous samples and also that four samples can be prepared at one time, which is about the maximum number which a taster can accurately compare.

After a considerable number of trials, even the blandest types of shortening were found to interfere with accurate

Flavor SCORE
DRIED WHOLE EGGS

SCORE	FLAVOR DESCRIPTION		
10	EXCELLENT	*Comparable to fresh egg*	*Suitable for Household Use*
9	VERY GOOD		
8	GOOD		
7	SLIGHT STORAGE FLAVOR		
6	STORAGE FLAVOR		
5	SLIGHT "OFF" FLAVOR	*Not acceptable for Household Use*	
4	DEFINITE "OFF" FLAVOR		
3	OLD *and* UNPLEASANT FLAVOR		
2	VERY OLD *and* UNPLEASANT FLAVOR		
1	INEDIBLE		

FIG. 3. As a guide in scoring the flavor of the cooked samples the British system of rating is used.

flavor evaluation. Likewise, salt shows a tendency to mask slight differences in flavor between samples. Cooking tests also indicate that the water in the poacher should be boiled gently. If the water boils too vigorously, a thick hard skin is formed on the surface of the eggs and the cooked eggs acquire a rather rubbery consistency.

As a general rule, 5 to 6 minutes is the optimum cooking time. However, storage of the dried eggs under various conditions will produce a variation in the consistency of the reconstituted egg. This variation in consistency may affect the evaluation of flavor. For this reason, cooking some of the samples for an additional minute or two is sometimes desirable. In general, the better practice is to overcook the eggs rather than to undercook them. When the samples are not cooked long enough, the eggs may be soggy or grainy; a condition that interferes with accurate flavor evaluation.

The cooked eggs are removed from the pans, placed on numbered plates

FIG. 4. Each sample is independently rated by each taster on a "blindfold" basis and record made on an individual score card for subsequent comparison with ratings given by other tasters.

FIG. 5. At the end of the tasting session the ratings on individual score cards for each sample are recorded on a recapitulation sheet for comparison and future study.

FIG. 6. After the results of several tasting sessions have been obtained a composite graphic recapitulation sheet is made to determine trends of data with respect to the suitability of various types of containers and storage conditions for dried whole eggs over several time intervals.

and allowed to cool slightly before blind tasting. All of the samples are rated numerically from 1 to 10 in accordance with the rating used by the British. Fig. 3 is a chart prepared by Leon D. Mink, of Swift & Co., showing the scoring system. This system has the advantage of placing a numerical value on flavor which may be tabulated. It has been demonstrated that eggs receiving a rating below 6 by this test may be made acceptable for table use by the addition of suitable condiments. Nevertheless, the system is far better than the usual practice of numerical preference rating only, by which method no effort is made to distinguish the degree of difference between the best and poorest.

In carrying out the flavor test each examiner is given a small card for each group of four samples upon which he enters his rating. In all cases the tests are made blind; the examiner does not know the nature of the sample or anything of its history. Likewise, any comments on the samples are withheld until all results have been recorded. Special note is made of any foreign odor or flavor found in any of the samples. The committee has tried to limit its rating to flavor only and to disregard the color or consistency of the samples.

In many of the tests, fresh shell eggs are occasionally interspersed with the dried egg samples. A fact of interest is that, by this test, a fresh egg is practically tasteless. For this reason, the presence of any flavor, good or otherwise, should be considered an indication of deterioration of the sample. In other words a sample having a pleasing egg flavor by this test would probably be rated 9, or possibly 8, by most examiners. Individuals who have had no previous experience in using this system have difficulty in rating the first 6 or 8 samples. However, at about this point their ratings coincide surprisingly well with individuals who are accustomed to using the British scale of flavor rating.

Accuracy of Results

Since the examinations are usually made on from 20 to 40 different lots of eggs, accuracy is essential. For this reason, most of the tests are made in duplicate; the duplicates are rarely tasted together and the tests are always blind. The use of duplicates is also useful in gaging the ability of various flavor tasters.

The accuracy of the method has been well demonstrated on several occasions when relatively large groups of samples have been examined by the committee along with a considerable number of other individuals associated with the egg products industry. In most cases, the other tasters are in exceptionally close agreement with the committee's ratings; the average of the entire group usually agrees within 0.2 or 0.3 of one rating point. As a further check on the accuracy of the method, certain samples have been examined blind during flavor tests conducted on two or three different days. In practically all cases, the results agree within ± 0. 5 rating point.

TABLE I—Duplicate Results of Three Individuals' Flavor Tests on 12 Samples of Dried Whole Eggs.

Sample No.	Examiners' ratings* A	B	C	Average rating
1	7.5	7.5	8.5	
	7.5	7.0	7.0	7.5
2	7.5	7.5	7.5	
	7.5	7.0	7.0	7.3
3	7.0	8.0	7.0	
	7.5	8.0	7.0	7.4
4	6.5	6.5	7.0	
	7.0	7.5	7.0	6.9
5	7.0	7.5	7.0	
	7.0	8.0	7.0	7.2
6	7.5	7.5	6.5	
	6.0	7.5	6.5	6.9
7	7.5	7.0	7.0	
	7.0	7.5	6.5	7.1
8	6.5	8.0	6.0	
	6.5	6.0	7.0	6.7
9	6.5	7.5	6.5	
	6.5	7.5	7.5	7.0
10	7.0	7.0	6.5	
	7.0	7.0	7.0	6.9
11	8.5	8.0	8.0	
	8.0	7.5	8.5	8.1
12	4.5	3.5	4.0	
	4.0	4.0	4.5	4.1
Total points off average	2.1	3.4	2.4	
Total points off duplicates	4.0	6.0	6.0	

* Using British flavor rating system shown in Fig. 3.

Table I further illustrates the accuracy of the method. In this table are given the flavor ratings of three individuals on 12 samples in duplicate at one typical examination. A point of interest is that the three tasters were, as a whole, able to check their results very closely; also, with the exception of one sample for each taster, all three of them duplicated their own results within one rating point. In other words, the accuracy of the method when used by experienced tasters appears to be within the range of ± 0.5 rating point. This has been confirmed by the results of examinations of more than 350 samples examined in duplicate.

Cooling Storage Rooms By Brine Spray System

By G. O. WEDDELL
York Ice Machinery Corp., York, Pa.

PART I—Method introduced for food storage where rapid precooling, followed by holding at steady temperature, is desired—pioneered by citrus fruit growers—has improved results in apple storages. This article forecasts combination with quick freezing of fruits and vegetables

THE most important considerations in the proper and successful operation of a cold storage plant for apples, according to the U. S. Department of Agriculture data, are:

1. Fruit well-matured when picked.
2. Removal promptly thereafter to cold storage.
3. Rapid removal of field heat and cooling to storage temperature.
4. Holding at a uniform temperature of about 32 deg. F.
5. Removal from storage for marketing at the proper time, according to variety.

There is one other consideration. The entire operation must show a reasonable and fair financial return above all operating and fixed charges.

The keeping quality of apples in storage is definitely related to the cultural and orchard sanitation practices of the grower. His decisions are responsible for the production of sound, properly matured fruit. He will also have to determine the proper picking time in order to obtain the highest quality of flavor and appearance. According to the U. S. Department of Agriculture, apples that are fully grown and well colored have the best keeping qualities, will have less tendency to scald in storage, and are generally in better condition to be held in storage for the maximum period.

It is up to the grower to move the apples promptly from the orchards to the cold storage. While the daytime temperature may be 70 deg. F. or more in the September picking season, the temperature at night will fall considerably. Fruit picked during one day and hauled to the storage the next will lose considerable field heat during the night. This practice of delivering fruit to storage on the day following picking and in the shortest possible time is a very important link in the storage cycle.

Mechanical refrigeration is first applied in the third step. Oxidation begins as soon as the fruit is picked and since this can be retarded only by reducing the temperature, it is essential that it be reduced to storage temperature in the shortest possible time. The method by which refrigeration is applied will determine the length of time required to remove field heat. This precooling period is becoming recognized as the most important phase of the cooling cycle, and is the real problem in the cold storage of apples.

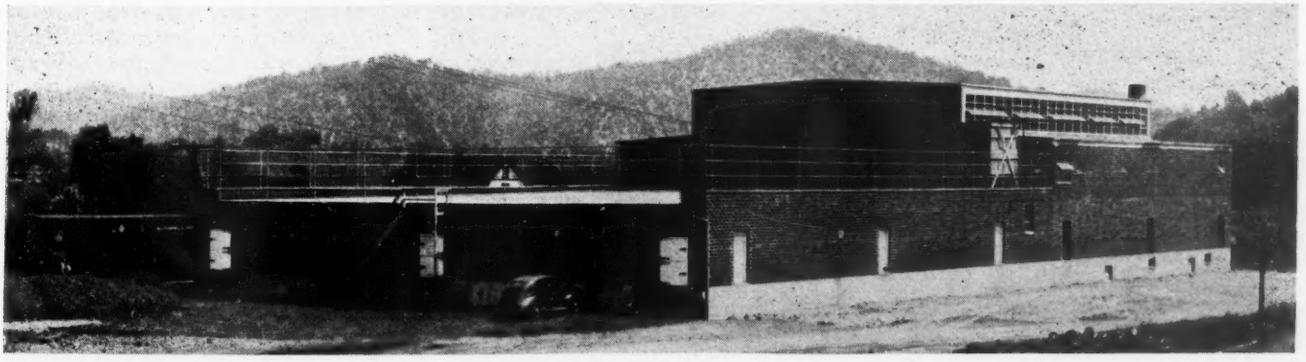
After the cold storage plant is filled, the rest of the job is just a matter of holding a uniform temperature automatically and continuously at about 32 deg. F. The refrigerating load is now light and the equipment should be selected for economical operation.

The final step of marketing the fruit at the proper time is one in which the grower combines his knowledge as a horticulturist with good business judgment. He knows his own fruit and the maximum length of time allowable for his different varieties to remain in storage before marketing.

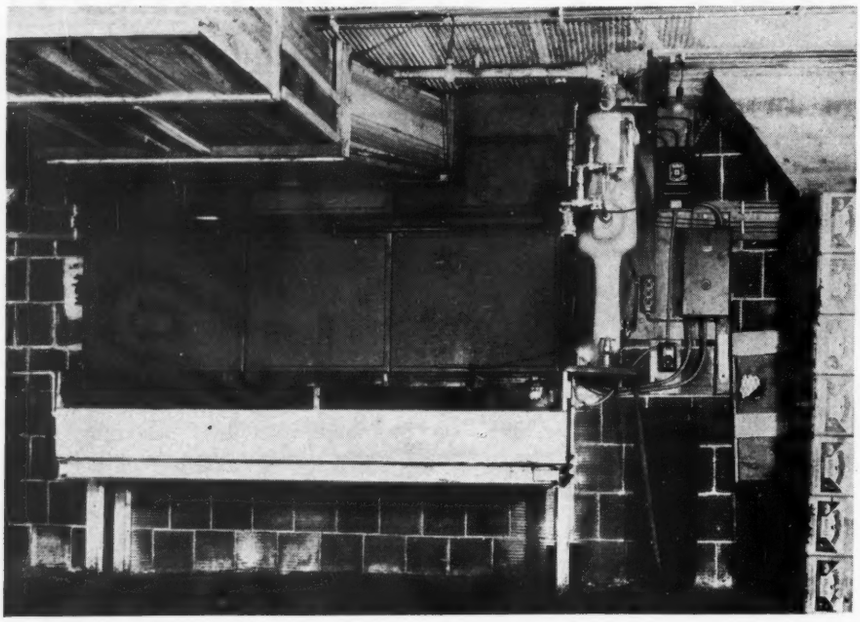
The Precooling System

With the many variables that enter into the refrigerating problem, it is necessary for the engineer to secure from the apple grower all data possible for proper calculation of the cooling duty and selection of equipment. The rate of loading, initial temperature of apples entering the storage, outside temperatures prevailing in that locality, construction of the building, amount of insulation and the length of the storage season are the principal factors affecting the design of the refrigerating plant.

Referring again to U. S. Department of Agriculture data, special emphasis



View of plant and railroad siding, Consolidated Orchard Co., Paw Paw, W. Va.



Spray-type air conditioning unit handling capacity of 13,000 cu. ft. air per minute

is given to the problem of precooling the fruit from field temperature down to storage temperature very rapidly. The time element in doing this has a direct bearing on the maximum length of time that the fruit can be held in storage in good marketable condition. In the states of Oregon and Washington it has been demonstrated that the most satisfactory method of precooling the fruit so as to secure the highest quality at the end of a six- to eight-month storage season is by the use of the brine spray system with chilled air properly distributed throughout the storage. This system was first developed for the precooling of citrus fruits in Florida. In 1920, seven plants were installed there and during the next three years twelve more installations were made. The list has now grown to more than sixty—all of the brine spray type.

In view of these experiences in the precooling of citrus fruits by the above method, the Yakima County Horticultural Union, Yakima, Wash., in 1925 put in their first brine spray air washer system of refrigeration for an apple storage. They now have eleven such plants. In 1926, the Yakima Fruit Growers Association installed their first brine spray job and now have ten such plants. Other large growers promptly followed suit and today there are in the Northwest approximately one hundred cold storage plants, ranging in size up to 500 carloads, refrigerated in this manner.

As further emphasis on this phase of the cold storage operation, recent installations in the Northwest have been built with a separate room for the rapid precooling of the fruit. To accomplish this, large volumes of chilled air from the brine spray washer are forced in and around the boxes throughout the stacks. During this past season the temperatures of the fruit in these precooling rooms have been tested by the use of thermocouples imbedded in the core of the fruit at the center of boxes placed throughout the stack. These tests indicated that the very center of the fruit had been cooled from a field temperature of 70 deg. F. to 36 deg. F. in 72 hours.

In contrast to the above method of effective precooling, tests have been made in some storage plants where there was only a natural air circulation. It has been found that at the end of 60 days, the core temperature at the center of the boxes was nearly 50 deg. F. In other words, for a very considerable period of time it is possible to cool the apple storage room without cooling the fruit.

The outstanding performance of brine spray systems in maintaining proper humidity, as well as temperature, is further indicated in the practice of some of the large growers in the Northwest who are gradually replacing their direct expansion pipe coil systems with brine spray air washers.

First Eastern Installation

The first large apple storage installation in the East using the brine spray system with air distribution by means of ducts was that made in 1939 by Consolidated Orchard Co., Paw Paw, W. Va. The design, construction and refrigeration of this plant were determined only after a thorough investigation and consideration of the practices and methods used in various sections of the country. In view of the prevailing practices is the apple growing sections of Virginia and West Virginia, I think it is only fair to acknowledge that in this plant Henry W. Miller, Jr., turned away from the beaten path and did some pioneering on his own account and responsibility.

This apple storage, built for a 50,000-bu. capacity, is of fireproof construction throughout. The building is approximately 120 ft. long by 100 ft. wide by 12 ft. high, with a packing house 100 ft. long by 100 ft. wide on one end. A railroad siding runs the length of both rooms on one side. The layout is such that a second cold storage may be added on the other end of the packing house. On 12-in. concrete foundation walls, one layer of 8-in. and one layer of 4-in. tile with cement plaster between were used in the construction of the curtain-type walls. The concrete roof slab is supported independently of the walls on concrete columns on 20-ft. centers.

It was definitely known that this plant would be used for the storage of apples and that the maximum season would be from about September 15th to May 1st. Therefore, on account of sun effect, large area, and so forth, the ceiling was insulated with 4 in. of corkboard, laid in hot asphalt on top of the concrete slab. Tar and felt roofing were then laid on the corkboard and on top of this a concrete-finish floor was laid so that the roof could be used for the storage of boxes and other materials, if necessary. The floor consisted of a concrete slab laid on top of 24 in. of boiler cinders. No insulation was used on the walls and the tile was not plastered.

The refrigerating equipment consists of a vertical single-acting double-cylinder ammonia compressor of 26.5 tons refrigerating capacity at 30-lb. suction pressure and 155-lb. condensing pressure, driven by a 40-hp. motor. The compressor is equipped with automatic 50 percent capacity reducing valves. A closed type shell and tube ammonia condenser, a receiver, a spray cooling tower and a water circulating pump make up the condensing system. The evaporating side consists of two spray type air conditioners each with fans driven by a 5-hp. two-speed motor with adjustable pulley for further speed regulation, a brine spray pump and galvanized ammonia coils with surge drum and float control. Each air conditioner has a capacity to handle from 6,000 to 13,000 cu.ft. of air per minute, depending on the speed. A discharge air duct from each unit, 18 in. deep, is hung from the ceiling and ex-

tends almost across the 100-ft. width of the storage. The operation of the compressor, the capacity reducing valves and the condensing water pump is controlled automatically by thermostats in the storage room.

Engineering Calculations

A careful recheck of the engineering calculations on this job, based on the best data available as to heat conductivity through building materials and insulation, makes an interesting study.

The first data needed are the mean outside temperatures for the months in which the storage will be refrigerated. The U. S. Weather Bureau has had a station at Romney, W. Va., for 40 years. The normal temperatures indicated on the monthly reports of this station are the averages of the maximum and minimum daily temperatures for this period of time, and for Paw Paw would be practically the same as Romney. These were used in the table given with this article.

The maximum refrigerating duty for this job includes the following items:

1. Heat leakage into room through walls, floor and ceiling.
2. Cooling the apples at a rate of 2,000 bu. per day during September 15th to 30th, and 3,000 bu. per day in October.
3. Cooling the boxes or baskets.
4. Heat of fan and brine pump motors.
5. Heat from men working in the storage.
6. Heat from electric lights.
7. Sun effect on the roof.
8. Heat due to respiration of the apples.
9. Cooling the air brought in for ventilation.

Based on a 60-deg. F. ground temperature and using safe values for heat conductivity through the various room surfaces, the refrigerating loads for each month of the storage season were calculated as shown in the accompanying table. In order to determine what the penalty might be for the omission of 4 in. of corkboard insulation on walls and floor, detailed calculations were made on the same basis for the refrigerating loads with the building insulated on walls, floor and ceiling with 4-in. of corkboard. The temperatures inside were taken at 35 deg. F. during the loading and 32 deg. F. during the holding period.

It so happens that the reduction in tonnage by the use of 4-in. corkboard throughout would not permit the use of the next size smaller refrigerating machine, but would require the same size machine operating at a slower speed and using a 30-hp. instead of the 40-hp. motor. The balance of the equipment would remain the same.

Based on prices for materials and labor prevailing at that time, an estimate of the cost of the present construction as compared to the usual installation with 4-in. corkboard on walls, floor and ceiling indicated that there was a saving of approximately $8,500.

An estimate of the savings in electric power, made by the power engineer, plus 25 percent for approximation, amounts to $300 for the storage season from September 15 to May 1.

Without considering the question of depreciation, the interest on $8,500 at 5 percent per annum amounts to $425. Therefore, instead of a penalty, there is a savings of approximately $125 per year for the present construction over 4-in. corkboard insulation throughout.

In the summer of 1940, Consolidated Orchard Co. decided to refrigerate the space under the packing room, approximately 100 ft. by 85 ft. by 7 ft. high. The floor was excavated sufficiently to put in 15 in. of cinders and on top of this a concrete floor was laid. The ceiling was insulated with one layer of 1-in. Celotex board. The 12-in. concrete walls were not insulated.

For refrigerating this space they used only one spray type air conditioning unit of the same size as installed for the first floor storage. They also added another condenser and increased the capacity of the cooling tower.

The capacity of this basement room is 20,000 bu., making a total of 70,000 bu. of storage space. The following data from the Potomac Edison Co. cover the season from Sept. 10, 1940, to May 26, 1941, for both refrigerated rooms:

Total kw.-hr. used by refrigerating plant operation = 114,106
Total cost of power = $2,054.

$$\text{Cost per kw.-hr.} = \frac{\$2054}{114106} = 1.8 \text{ cents}$$

$$\text{Cost of power per bushel per season} = \frac{\$2054}{70,000} = 2.93 \text{ cents}$$

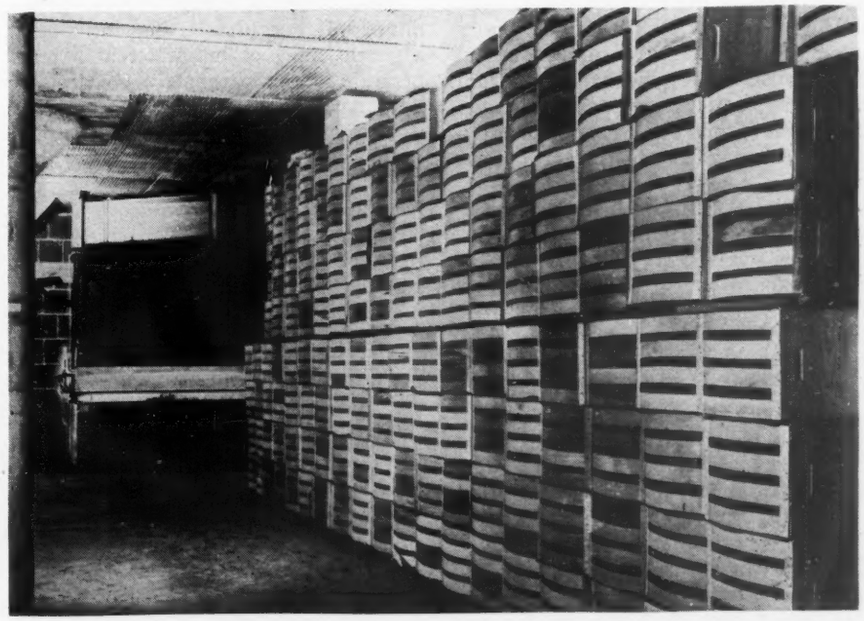
Part II of this article, giving examples from additional installations, and pointing out the possible applications of this refrigerating system to the quick freezing of foods, will appear in an early issue.

Refrigeration Requirement for Apple Storage

Consolidated Orchard Co., Paw Paw, W. Va.

Month	Approx. loading of storage	U. S. Weather Bureau normal outside temp., deg. F.	Design temp. outside, deg. F.	Design temp. inside, deg. F.	Temp. diff., deg. F.	Max. tons refr. bldg. as now constructed	Max. tons refr. bldg. insulated 4-in. ckbd. throughout	Tons refr. saved with complete insulation
Sept. 15–30	*20,000	63.0	65	35	30	24.9	20.1	4.8
Oct.	**50,000	54.9	57.5	35	22.5	26.5	22.5	4.0
Nov.	50,000	43.1	45	32	13	13.7	10.4	3.3
Dec.	50,000	34.5	35	32	3	11.8	9.5	2.3
Jan.	35,000	31.5	32	32	0	10.0	8.0	2.0
Feb.	25,000	34.2	35	32	3	10.5	8.2	2.3
Mar.	20,000	36.4	37	32	5	10.8	8.3	2.5
Apr.	10,000	51.7	52	32	20	13.2	9.2	4.0

*Based on maximum loading of 2,000 bu. per day. **Based on maximum loading of 3,000 bu. per day.



Another view of air conditioning unit and air distribution system inside storage room

Brief Summaries Of AMS Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow and those which appeared in the August, September, October and November, 1941, and July and August, 1942, issues are a continuation of the series begun in 1940.

The complete text of the standards can be obtained from the AMS, located in Washington, D. C.

Frozen Peas

FROZEN PEAS are the vegetable prepared from the seed of the common garden pea by shelling, washing, and precooking (blanching) and are frozen and stored at temperatures necessary for the preservation of the product.

U. S. GRADE A or U. S. FANCY frozen peas are peas of similar varietal characteristics, are practically free from defects and foreign material, are tender, possess a normal flavor and odor, and are of such quality with respect to color as to score not less than 85 points when scored in accordance with the scoring system outlined herein.

U. S. GRADE B or U. S. EXTRA STANDARD frozen peas are peas of similar varietal characteristics, possess a fairly uniform green color, are fairly free from defects and practically free from foreign material, are fairly tender, possess a normal flavor and odor, and score not less than 70 points when scored in accordance with the scoring system outlined herein.

OFF-GRADE frozen peas are peas that fail to meet the requirements of U. S. GRADE B or U. S. EXTRA STANDARD.

Federal inspection certificates covering frozen peas shall indicate the size or combination of sizes found upon examination. The various sizes of frozen peas are as follows:

No. 1 size peas are peas that will pass through a screen of 9/32-in. mesh.

No. 2 size peas are peas that will pass through a screen of 10/32 in. mesh but not through a screen of 9/32-in. mesh.

No. 3 size peas are peas that will pass through a screen of 11/32-in. mesh but not through a screen of 10/32-in. mesh.

No. 4 size peas are peas that will pass through a screen of 12/32-in. mesh but not one of 11/32-in. mesh.

No. 5 size peas are peas that will pass through a screen of 13/32-in. mesh but not through a screen of 12/32-in. mesh.

No. 6 size peas are peas that will pass through a screen of 14/32-in. mesh but not through a screen of 13/32-in. mesh.

No. 7 size peas are peas that will pass through a screen of 15/32-in. mesh but not through a screen of 14/32 in. mesh.

"Run of the pod" means that peas of all sizes have been packed together. "Garden run" means that all sizes have been packed together except that peas of sieve sizes No. 1 and No. 2 have been eliminated.

The grade of frozen peas is determined after complete thawing under a gentle spray of tap water at a temperature of approximately 68 deg. F. The flavor and odor of frozen peas is determined after cooking the peas in boiling water for 6 minutes (from the time the water boils after the peas have been added) in an uncovered container. Normal flavor and odor means that the peas, when properly cooked, are free from objectionable and off-flavors or odors of all kinds. The grade of frozen peas may be ascertained by considering, in addition to other foregoing requirements, the following factors: Color, absence of defects, and tenderness and maturity.

The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically. Spotted or off-colored peas, such as brown, gray, white or yellow white peas that are defects, are not considered in evaluating the "color" factor.

To receive a score of 17 to 20 points, the peas must possess a practically uniform typical green color, which means a practically uniform characteristic green color not lighter than Plate 17, I-9, as illustrated in Maerz and Paul's "Dictionary of Color."

Peas that possess a fairly uniform green color may be given a score of 14 to 16 points. "Fairly uniform green color" means that the green color may be slightly variable with not more than 10 percent by count of the peas lighter in green color than Plate 17, K-6.

Peas that fail to meet these requirements may be given a score of 0 to 13 points and shall not be graded above Off-Grade, regardless of the total score for the product.

Spotted or off-color peas are considered as major defects. Broken peas or loose skins are considered as minor defects. A "broken pea" is one so damaged that a cotyledon has become separated from the pea. "Practically free from foreign material" means that there may be present not more than one piece of foreign material (such as a thistle bud) approximating the size of a pea, per lb. of peas, or per package, if the package is less than 1 lb.

Tenderness and maturity are determined by brine flotation tests. The brine solution is based on the percentage of pure salt in solution, as determined by salometer reading immediately prior to making the tests. In making the tests a 250 ml. glass beaker is filled with brine solution to a depth of two inches. The temperature of the solution and the peas tested should approximate room temperature. Only peas that sink to the bottom of the receptacle within 10 seconds after immersion are counted as "peas that sink." "Fairly tender" means that not more than 5 percent by count of the peas, with skins removed, sink within 10 seconds in a 16 percent salt solution. Peas that fall into this classification shall not be graded above U. S. GRADE B or U. S. EXTRA STANDARD, regardless of the total score for the product.

When certifying samples which have been officially drawn and which represent a specific lot of frozen peas, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if

(*Turn to page 109*)

Develops New Market For an Old Product

By SUMMERFIELD A. McCARTENEY
As told by KARL PITSCHNER
Albuquerque Food Products Co., Albuquerque, N. M.

In eleven years, Karl Pitschner has developed a thriving business processing pinon nuts from the forests of the southwestern states, meeting unusual problems in this comparatively new field of the edible nut industry

IN 1931, Karl Pitschner made a trip from Akron, Ohio, to the southwestern states. On this trip he encountered an Indian trader, Lloyd Ambrose, at Thoreau, N. M. During the course of an evening at a Navajo yeibichsi dance (sacred dance) Ambrose learned that Pitschner was an engineer and suggested that he work on a pinon sheller, advising him that there should be a great market for shelled pinons.

Upon the completion of his trip, Pitschner returned to his home in Warren, Ohio, and immediately undertook the problem of tackling the development of a pinon sheller. The possibilities of a hand shelling device were discounted when it was discovered that the best one could do was twelve per minute and there were 2,900 meats to the pound. Pitschner made hundreds of micrometer caliper measurements on nuts and kernels. Next he undertook the problem of a sheller, the principle of which remains a trade secret.

Within six weeks, with the facilities of the Warren, Ohio, high school machine shop to draw from, the first crude machine sheller was completed and found to give considerable promise. Through the micrometer caliper measurements a screen system was devised which separated the cracked and uncracked nuts, making it possible to crack the nuts more gently and prevent the breaking of the meats.

With the financial aid of his brother-in-law and the principal of the Warren High School, Pitschner ordered a large supply of nuts. These were shelled and sold in Ohio. Prior to this time pinon nuts were unknown in that state. However, it was deemed more advisable to transfer the new project to the source of supply. The purpose was to save freight on the shells and also provide the facilities of a market where the nuts were better known.

The crude equipment first built was transferred to New Mexico, a warehouse in Albuquerque being used as temporary headquarters. Some business was almost immediately developed, and the machinery was reconstructed to make it more efficient. But because of the novelty of the product, the development of the pinon business was an uphill climb, and finding new markets to keep the little plant busy was a constant problem. Meanwhile the business was moved to a vacant store building and six years were spent in pioneering the gradually growing enterprise. During this period the shelling machines were rebuilt several times and the processing improved to make the nuts more satisfactory for marketing.

The second summer in Albuquerque was spent in making a survey of the pinon producing areas of New Mexico for the Chas. Ilfeld Co., Albuquerque. This company has been for many years the largest buyers of pinon nuts in the United States. The success of the survey provided the first detailed report for the commercial marketing of pinons.

At the end of six years the sales finally justified the building and lease of a small modern plant. And as the business grew the shelling and other machinery was improved.

The present shelling machine pro-

The small modern plant of Albuquerque Food Products Co., Albuquerque, New Mexico, has complete facilities for cleaning, shelling, drying and roasting the pinon nut meats. Part of the yearly supply of nuts is shipped in the raw state to distribution centers; the rest is roasted and packaged for the retail trade, or made into candies.

duces 200 lb. of meats per hour with a breakage and loss of not more than one-half of one percent. The machinery is rugged and requires little mechanical care beyond the repair of belts. It is operated by inexperienced labor. To date approximately half a million pounds has been put through the various machines.

The processes used today in this plant consist of the following steps:

1. Tumbling and cleaning of the nuts, as received, with sawdust to remove all dust.
2. Screening of the nuts into four sizes to facilitate the separation of the cracked from the uncracked nuts.
3. Sterilization of the nuts by live steam.
4. Passing the nuts through the shelling machine, separation of the shelled nuts and returning of the unshelled nuts to the sheller.
5. Final mechanical removal of the shells from the meats by air classification.
6. Hand sorting to remove rancid and discolored kernels and about one-tenth of one percent of unshelled nuts. Then drying of the meats in a rotary oven for shipment in the raw state.
7. Oil roasting under careful temperature control. Next the packaging of the meats in cellophane, or in boxes for the retail trade.
8. A label is placed on each box to acquaint the customer with the history of pinons.
9. Manufacture of pinons into various types of candy such as brittle, toffee, creams, clusters and caramels.

There are four species of the nut pines found in the southwestern section of the United States. They are: (1) *Pinus edulis*. This species is found from eastern New Mexico to central Arizona and from central Colorado to southern New Mexico including the southeastern corner of Utah; (2) *Pinus monophylla*, found from central Utah westward through Nevada to the California mountains, (3) *Pinus cembroides*, found in old Mexico, (4) *Pinus parryona*, an obscure species, found in Riverside and San Diego counties, California, also on the peninsula of Lower California in old Mexico.

Of these species the one found in New Mexico, Colorado and Arizona, *Pinus edulis*, is by far the most edible, the most satisfactory and the one in which the Albuquerque Food Products Co. has greatest interest, although it does not yield the largest percentage of meats. The yields of the meats of the first three species are about as follows: *Pinus edulis*, 45 percent to 53 percent; *Pinus monophylla*, 5 to 62 percent; *Pinus cembroide*, 30 to 35 percent.

The meat of *Pinus edulis* is characterized by a delicate pleasing flavor and roasts to an appetizing golden brown. The meat of *Pinus monophylla* is somewhat wooden and turpentine-like but roasts to a satisfactory color. The meat of *Pinus cambroides* is very small and pink and it roasts to an unsatisfactory, unappetizing grey color.

The principal species, *Pinus edulis*, commonly called the New Mexico pinus, is found in the canyons and on the slopes and foothills of the New Mexico Rockies and on the high mesas of the Arizona deserts. The altitude at which it is found depends somewhat on the latitude, occuring lower down in the northern extremity of the range than at the southern end.

The nuts are gathered mostly by Mexicans and Indians. The Navajo Indians are the most skillful pickers. An industrious squaw can gather up to 20 lb. of nuts in a day by hand picking. Various mechanical pickers have been devised but their product is so dirty that it becomes a major operation to separate the nuts. It is doubtful if a satisfactory machine will ever be perfected to compete with the industry of a Navajo squaw.

The crop which has been gathered in a single year has amounted to as much as seven million pounds, but this is only a small percentage of the nuts which fall. It has been estimated that on a square mile of good producing pinon timber 10,000 lb. can be gathered with the picking of one nut in four.

There is somewhere in the neighborhood of 100,000 sq. mi. of *Pinus edulis* growth. It has been estimated by experienced Indians that certain single trees would yield as much as 40 lb. of nuts. Of course, much of this territory is at present inaccessible and the trees grow in localities where the nuts cannot be gathered. Other areas are so crowded with their own growth and with junipers that the seeds do not develop. Still others grow in such places that there is insufficient water to fill out the seeds.

Several experiments have been carried toward the semi-cultivation of the New Mexico species of nut pines. In one instance, nuts were produced which were 1½ to 3 times the size of the ordinary nut.

It is Pitschner's belief that in the hands of adequate and constructive capital the pine nut industry can become one of the major divisions in the field of edible nuts. The pinon nut is far superior in flavor and usefulness to the pignolia which was formerly imported from Spain and Italy.

Pinons have soft shells which are easily crushed and contain solid kernels of sweet white meat. Among the Navajos, Hopis and other tribes, the nuts are eaten raw or roasted, but their chief use is in the form of a meal into which they are ground and from which cakes are made. The Navajos also make the nuts into a paste which they use as we do butter. Nuts that are not consumed by the family are bartered at the trading posts for foods, velvet and calico.

Product of the mountain scrub pine, pinon nuts have been gathered for years by Navajo Indians. Albuquerque Food Products Co. buys the nuts from Indian workers, and manufacturers pinon candies such as brittle, toffee, creams, clusters and caramels.

How Food Plant Set Record for Safety

By ANDREW M. SMITH
Personnel-Safety Director, Godchaux Sugars, Inc., Reserve, La.

Honest investigation of even the most minor accidents has achieved notable results. Accident hazards and unsafe practices are revealed and corrected before serious injury occurs

WITH the cooperation of all supervisory help we find that by thorough investigation of all accidents, including the most minor first-aid cases, we have been able not only to maintain a satisfactory safety record, but we reduced our frequency and severity rates to an all-time low.

Investigation of the true causes of minor accidents, rather than the superficial causes, has been a revelation to us and probably as important as any one factor in keeping up a safety record.

Our system of investigation has been so exacting that it is as a prevention factor invaluable. Men are more alert to report and correct visible hazards, thereby reducing the number of injuries as well as investigations. To illustrate let me cite the case of an employee who reported for first-aid treatment with a small laceration. The foreman's report showed that a spray pipe in a centrifugal dryer had loosened. Attempting to straighten this pipe manually while the inner basket whirled at 1,800 r.p.m., the victim barely nicked a knuckle. Additional investigation revealed that at a previous date one of these spray pipes had been thrown out of a machine with such force it had gone through a window and after crossing an areaway had pierced an adjoining roof. Dangerous? Decidedly so! And we were not ready to close the case by disciplining the man who made an adjustment on a machine in motion, which is a safety-rule violation. Further check-up revealed that a few nonstandard bolts had been used on the spray-pipe brackets of several machines. Servicing had been done by operators who used odd-size bolts. This work is now performed by authorized mechanics who are held responsible for the materials used.

A practical form of Investigation Report has been adapted to our organization. An injured worker presents the completed report at the first-aid room. The report must evidence something actually done to prevent a similar occurrence from the causes determined. Such an out as "be more careful" is taboo. We have a book full of slogans. A typically thorough investigation will be reported in this manner: "I have instructed operators to refrain from making adjustments of this kind and to report requirements to the mechanics. Also, reinstructed all men not to adjust, oil or clean any machinery while in motion. I will personally double-check men and machines periodically to make sure these instructions are carried out."

The foreman must account for every injury to workers. There is seldom a failure to report slight injuries. The danger of infection resulting from neglect is emphasized continually, and occasional reference is made to an established safety regulation which carries a penalty for such failure.

Departing from average systems, we charge departments with total injuries. As reduction of total frequency of injuries is our aim, each department com-

When the green light burns on this safety bulletin board it means that there has not been an accident of any kind for the past 24 hours. Following even a minor accident, the red light flashes on and is lighted for 24 hours. A description of the accident and its cause is posted on the board. Safety posters are also displayed there.

WOMEN SHOP WORKERS

SHOP hazards can be minimized by following safe practices. Here are a few good suggestions:

1. Always take time to eat a good breakfast, and come to your work feeling physically fit.
2. If you work on a machine, be sure that all guards are in place before starting operations.
3. If in doubt about any mechanical or safety procedure, ask your supervisor.
4. Do not wear rings or jewelry when working on machinery.
5. Confine your hair in a net or cap, and wear snugly-fitting garments; loose sleeves and other loose garments are easily caught in moving machinery.
6. Wear goggles if there is danger from flying particles.
7. High heels are especially hazardous in the shop; wear low-heel shoes while at work.
8. Do not run on stairways; walk, and use the handrail provided.
9. Fatigue is increased by "slumping" in your chair. Sit erect, and bend at the hips when necessary, not at the waist.
10. If you feel ill while at work, don't hesitate to tell your supervisor.

SAFETY INSTRUCTION CARD No. 332

With the increase in the number of women workers made necessary by wartime demands on manpower, special attention should be paid to the safety of women employees. Some excellent advice is given on this safety instruction card of National Safety Council.

petes with its own individual previous year's record. A percentage of improvement is published monthly and keen interest is shown by all employees in their department rating.

We are still using the departmental bulletin board. We now provide a space for the description of any accident which may have occurred during the previous 24-hour period.

When green lights burn on the departmental bulletin boards at the Godchaux plant it means there has not been

(*Turn to page 99*)

Control Sheet Saves Trucks, Tires, Fuel

Daily record of facts on operation of each vehicle provides basis for reducing mileage. This conserves critical materials and cuts expenses as well

WHENEVER the president of a food company complains that his truck transportation or distribution costs are too high, a round of buck passing generally results unless there are dependable facts available covering the details of the operation.

When Paul E. Reinhold, president of Foremost Dairies, Inc., sought to reduce truck distribution costs at the main plant and at branch plants it became necessary to devise and install some form of a daily master control sheet from which the necessary facts could be obtained. These data were needed for the main plant at Jacksonville, Fla., and for the branch plants, located at Daytona Beach and Orlando, Fla.; Atlanta, Columbus, Savannah, Thomasville and Valdosta, Ga.; Birmingham and Montgomery, Ala.; Spartanburg, S. C.; Charlotte, N. C.; and Sharpsburg, Pa.

The problem was roughly divided into three parts: (1) To devise the sheet so as to get all the essential information, (2) to get records on the sheet itself at a minimum of expense, and (3) to build up the records so obtained and correlate them with the regular bookkeeping records of the company to the end that any irregularities or expensive methods of operation would be divulged so that steps could be taken to correct them as a means of reducing costs.

In the August issue of FOOD INDUSTRIES, the control island on which the daily master control sheet is placed was shown in detail and the various physical operations which took place in supplying gasoline, oil and water to the trucks were explained. This article tells about the master control sheet itself and how it was employed first to cut costs and then keep them in line.

Cutaway parts of the master control sheet as actually filled out in operation are reproduced on the opposite page. The actual location of the sheet on a desk on the truck control platform is shown in the illustration on this page.

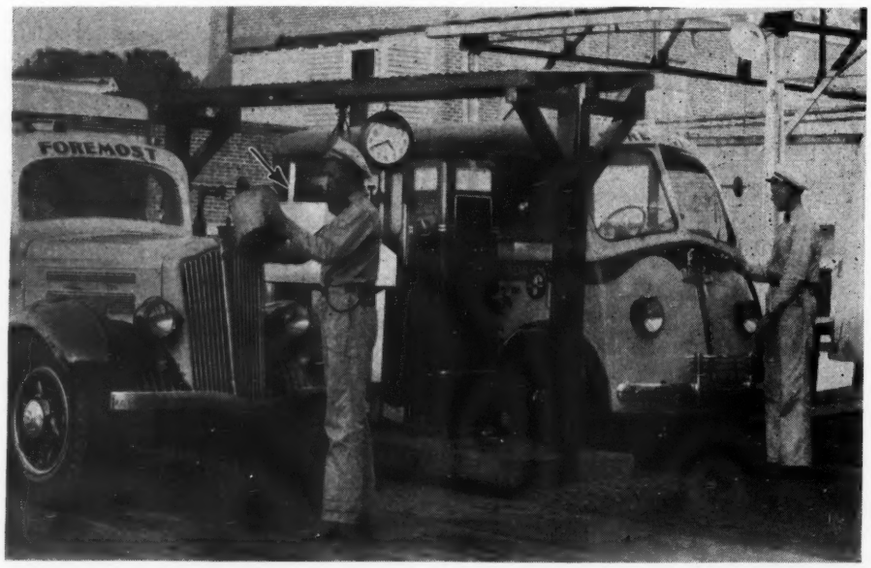
Because motor truck costs vary more nearly with mileage than any other factor, one of the prime requisites of the master control sheet is to provide an accurate record of mileage run. Total monthly mileage divided into total monthly exepenses gives a rough yardstick of overall cost per mile. Such a figure helps as a guide from month to month or for a given month as compared to the same month of the year previous, but in itself is not enough unless all the trucks in the fleet are of the same general type and do the same kind of work.

In the Foremost Dairies operation, five different classes of vehicles are employed, including retail milk trucks, wholesale milk trucks, ice cream trucks, Frigidaire department trucks and company-owned and private passenger cars. It is thus necessary to group these five classes of vehicles separately on the master control sheet to obtain separate group mileage records.

To obtain adequate mileage records it is imperative that each vehicle in the fleet be equipped with some commercially accurate mileage-recording device. When the master control sheet was first installed, it brought out the fact that the recording speedometers on approximately one-fourth of the trucks were not recording. These were repaired as rapidly as possible so that a true total mileage by group could be obtained.

The mileage run by each truck each day is secured by providing on the sheet a line for each truck. Beginning at the left are column spaces for the truck number, make and capacity; the driver's name; the time in and out; the route number; the starting and finishing speedometer readings; the miles run; the gallons of gasoline and quarts of oil used; the gas pump reading; three blank columns and a final column for remarks.

In operation, a clerk in the office of the automotive superintendent makes out the sheet or sheets for each day, setting down on one or two lines the truck numbers, makes and capacities. In the Foremost operation, two sheets are used



The truck control island of Foremost Dairies, Inc., at its main Jacksonville, Fla., plant. Indicated by the arrow is the desk on which the daily master control sheet, reproduced on the opposite page, is placed to obtain the essential operating data required to effect various truck economies.

FORM T-11 (LARGE)

Part of Sheet 1

FOREMOST DAIRIES, INC.

DAY Mon DATE Nov. 3 1941

PLANT Jax

DAILY TRUCK REPORT

Milk Trucks

SIGNED W. M. Gehart

TRUCK NO.	TRUCK MAKE	TONS CAP	DRIVER	TIME OUT	TIME IN	ROUTE	NO. TRIPS	SPEEDOMETER START	SPEEDOMETER FINISH	MILES RUN	GALS. GAS	OIL QTS.	GAS PUMP READING	Milk Pts	Ice Cream Gals	REMARKS
1	Chev	3/4	H E Bray	1 35	9 00	①		19594	19666	67						
				9 45	3 10		2	19666	19710	44	8.7		032			
3	White	3/4	M Rogers	2 05	8 00	③		10928	10956	28	5.5	1	997			#30 oil
							2	10956	10988	22						
4	Chev	3/4	Shyfl	1 45		4		15254								
					8 10		1		15313	59	0	1				#40 oil
5	Chev	3/4	Shyma	2 06		5		9716	9738							
					9 15		2	38	9754	38	8.1	0	908			
6	Chev	3/4	Scud	1 50	8 45	⑥		10711	10758							
				9 35	1 45		2	10758	10770	59	8 3	0				
Part of Sheet 2 Total Ice Cream Trucks only										202	27.1	0				
TOTALS										(2) 70.0	(03)					

DAILY GASOLINE SUMMARY

ON HAND, A. M.	339 GALS.	METER READING, P. M.	130120
RECEIVED TODAY	227 GALS.	METER READING, A. M.	129850
TOTAL	566 GALS.	DIFFERENCE IN READING	270 GALS.
DRAWN TODAY	270 GALS.	DRAWN TODAY	270 GALS.
BALANCE ON HAND, P. M.	296 GALS.	OVERAGE OR SHORTAGE	00 GALS.

DAILY OIL SUMMARY

ON HAND, A. M.	192 QTS.
RECEIVED TODAY	QTS.
TOTAL	192 QTS.
DRAWN TODAY	3 QTS.
BALANCE ON HAND, P. M.	189 QTS.

Partial reproductions of two of the Foremost Dairies, Inc., daily master control sheets from which basic operating data are obtained. Note that a daily gasoline and oil summary or inventory is maintained. The gasoline balance is checked by two means, by "sticking" the underground tank and by the difference between the finishing and starting gasoline pump meter readings. Withdrawals are measured on an electric pump in gallons and tenths of gallons. The last three digits of the meter readings are put down on each withdrawal to discover the error in case the addition of the withdrawals does not equal the difference between the finishing and starting readings. Through the use of a supplementary individual truck cost system by truck numbers to include fixed charges and repairs, total group or individual truck costs by makes can be obtained by the addition of fuel, oil and tire costs per mile from the averages of the above sheets. Dividing such total costs by total miles, milk points or gallons of ice cream gives unit costs.

each day at the Jacksonville plant because of the 45 trucks in the fleet. At the smaller branch plants, a sheet with the same headings but only half as long and good for up to 15 trucks is used.

After the last truck out returns at night, the sheet for that day is closed, the sheet for the next day put in its place and the first sheet turned into the automotive office for compilation of the data.

At the Foremost plant in Jacksonville, prior to the recent advent of daylight milk delivery, the operations began shortly after midnight on the milk trucks and ended between 8 and 10 p.m. upon the return of the long-route ice cream trucks.

How It Works

The sheet illustrated on this page, shows that driver H. E. Bray took out Chevrolet milk truck No. 1 at 1.35 a.m. and at that time signed his name and recorded his starting time and the starting speedometer reading of 19,594. He returned to the plant at 9:00 a.m. and signed in at that time with a speedometer reading of 19,666. He left again and signed out on his collection trip at 9:45 a.m.

Up to this point the driver has done all the recording on the sheet. This takes but a few minutes and obviates the necessity of going to the expense of having an attendant on the control island beginning at midnight. The other drivers follow the same procedure.

But as gasoline, oil and water are serviced to the trucks from the control platform, a man is necessary for this work. Working from noon until 8 p.m. or until the last truck is in, his services are also utilized without extra expense to mark down the times in of the drivers who also call off to him their respective finishing mileage readings. These he enters on the sheet along with the quarts of oil and the gallons of gasoline given out to each truck and the last three figures of the meter reading on the gasoline pump for each gasoline dispersal.

When the data similar to that specified for the particular truck mentioned are entered on the sheet for all the trucks in operation, that day's sheet is removed from the control-island desk and sent to the automotive superintendent's clerk who next day begins his compilation of the operating data.

At the same time that the control-island attendant closes the sheet for the day, he marks down the gasoline pump meter readings and "sticks" the gasoline tank and oil highboys. These three operations are utilized in making the daily gasoline and oil summary at the bottom of the sheet.

Any gasoline shortage is shown on a special line at the bottom. From unexplained discrepancies of several hundred gallons of gasoline a month, the daily summary has reduced the discrepancies to not over 5 gal. out of roughly 7,000 gal. used a month.

Data which can be compiled from the master control sheet records by months include miles per gallon of gasoline and oil by groups and individual makes of trucks to indicate the least expensive. And by the use of an individual tire record card, the cost of tires per mile can be determined. Further, route production by milk points or ice cream gallons per day, hour or mile, can be computed.

Nash Pumps of "PYREX" BRAND GLASS

Deliver Your Product with Quality Unchanged

The Food Industries will find the new Nash Pumps of Glass particularly adaptable to the exacting liquid handling requirements of this field. Constructed of heat and shock resisting "PYREX" brand glass, they present a means of transferring liquid food products without impairment of flavor or quality. Food and glass have long been closely associated, and now Nash Pumps of Glass permit another step.

All working parts of these centrifugals, including impeller and casing, are constructed of sparkling glass, with complete transparency, permitting constant inspection of product for color and condition. If pump needs cleaning it is immediately made visible, and the pump may be readily opened, cleaned, and reassembled. A unique mechanical seal replaces the conventional stuffing box. Not only food products, but hot acids and brine cooled liquids are handled with equal facility.

Nash Pumps of Glass are at present available in two sizes, a 6000 gallon per hour unit for large installations, and a unit with a capacity of 10 gallons per minute for small installations, and laboratory and pilot plant operation. Bulletins describing these sensational pumps in detail will be sent immediately upon request.

NASH ENGINEERING COMPANY

238 S. WILSON ROAD • SOUTH NORWALK, CONNECTICUT

NEW PACKAGES & PRODUCTS

Heinz Condenses

H. J. Heinz Co., Pittsburgh, has entered the condensed soup field, to aid in supplying prepared foods under wartime conditions. The change from ready-to-serve to condensed soups is in conformance with WPB's Conservation Order M-81, to save the nation's tin supply.

Cream of pea soup is the first condensed product to be packed by the company, in 11-oz. cans with a new label. Other condensed varieties will be processed from receipes developed in the company's research department, as the vegetables are available. The familiar Heinz keystone appears on the new labels in white against a red background with blue lettering.

More Foods In Glass Pack

Food products that were formerly packed in tin and other containers are now appearing on the market in glass jars, jugs and bottles, conserving critical materials for the war effort. Well-known brands of fruits, vegetables, sirups, honey, sauces and condiments are now available in glass pack, such as those illustrated in Anchor Hocking Glass Corp.'s noncritical containers.

Visible contents, quality assurance, ease of cap removal and use of the container as a refrigerator jar, add to the appeal of glass-packed foods. Typical of products now being packed in glass are "White Oak" crystal white table sirup, a product of Wheeler-Barnes Co., Minneapolis, Minn., and "Golden Blossom" honey, distributed by John G. Paton Co., Inc., New York. In both cases the distinctive label has been carried over from the tin container to identify the new package.

Yeast Packed in Chipboard

Both the 8-oz. package and the 1½-oz. shaker box of "Bakon Yeast," processed by Bakon Yeast, Inc., New York, are now made of heavy chipboard with a tight paper wrap and black-plate ends. The 8-oz. package was formerly in tin and the smaller container was glass packed.

According to the company, the savory, bacon-like flavor of the yeast (smoked over hickory) is well preserved in the new containers, which are labeled with the same silver, black and white wrap.

Nescafe in Glass

Nestle's Milk Products, Inc., New York, is packing Nescafé in a 4-oz. glass jar; joining the swing from metal to glass containers. The new container represents a saving both in tin and in rubber, as the former cap had a latex sealing ring. The screw cap now used

has a wax-coated paper liner.

The hygroscopic product is protected until it reaches the customer by a moisture-proof "Filma-Seal," placed over the mouth of the jar under the cap. This is manufactured by Ferdinand Gutmann & Co., Brooklyn, N. Y., who also supplies the screw cap.

High-Flying Sweet

"Dextrose" candy, identical to that contained in the "K-Ration" developed by the Army Quartermaster Corps., is being served on Transcontinental and Western Air, Inc., transport planes.

Manufactured by Curtiss Candy Co., Chicago, the product contains pure dextrose, corn sirup, cocoa butter, oil of lemon and stearic acid.

The dextrose tablets were tested for months by the Quartermaster Corps. before they were included in the K-Ration (meat, biscuit, coffee and dextrose) to supply food energy and minimize the thirst of U. S. soldiers on war fronts. Their use by TWA lines will replace other refreshments and conserve space and weight on transport planes.

Photo by U. S. Army Signal Corps

food ★ ★ ★ ★ for fighters!

PACKED IN CROWN CANS!

IT'S not a fancy looking can. It was not designed for shelf appeal.

It's the M-2 Unit of U. S. Army Field Ration C . . . Meat and Vegetable Hash . . . to give it the full and official designation.

It's the "Iron Ration" to the men in the field . . . and while Crown makes only the container . . . we'll say that the contents are above and beyond anything that went to the front in 1917-18.

Crown is proud to think this can from our production lines is now on the front lines . . . one more Crown contribution to the war effort. Of course, Crown continues to supply its customers with the cans they need to fill the biggest pack they ever faced . . . the pack approved by the Government to feed America at war!

CROWN CAN COMPANY, PHILADELPHIA, PA., *Division of Crown Cork and Seal Company*
Baltimore • New York • St. Louis • Houston • Madison • Orlando • Fort Wayne • Nebraska City

INDEPENDENT AND HELPFUL CROWN CAN

OPA Promises Alternate Food Pricing Method

Needed to relieve squeeze on distributors due to higher replacement costs for inventories

CEILINGS over food prices became so weakened last month by economic pressure within the industry that OPA had to take action to shore them up. In addition to readjusting the level of several price ceilings, canceling others and establishing some new ones, Price Administrator Henderson promised the food industry an alternative pricing method. To be given to wholesalers and retailers by mid-September, this is intended to "avert any threat of disturbance to the country's food distribution system."

OPA's use of March as its ceiling price month caught food distributors with many selling prices based upon costs of inventories bought months earlier. Replacement costs had risen meanwhile for many items. So these distributors could not restock except at the risk of cash loss. This "squeeze," if not relieved, would have forced the low-priced distributors to drop important lines of food products, with the result that food would have moved to the consumer through distributors with relatively high ceilings. And the consuming public would have found only supplies of high margin goods on store shelves and counters.

This proposed general adjustment method will supplant the previous method of handling cases needing relief on an individual basis. The relief to be provided will be sufficient, OPA says, to permit both wholesalers and retailers to contract for various packs as they are available for the market. And OPA feels that previous trade reluctance to make forward commitments will disappear.

Several new food price ceilings were established by the OPA during the past month. A 60-day temporary ceiling was placed on lamb at the wholesale and retail levels, the ceiling period being July 27-31. A ceiling on sales at wholesale of fluid milk and cream in bottles or paper containers was also set, with March the ceiling month. Maximum prices for approximately 200 grades and types of green coffee were established in an extension of Revised Price Schedule No. 50. Prices of the natural oils and concentrates from which vitamin A is obtained were stabilized at levels substantially lower than those prevailing during the speculative flurry of 1941. Late in July OPA established a ceiling on fruit cake by means of a special formula, and later a basic pricing formula was announced for canned fruits and berries boosting the ceiling by 15 to 25 percent. A formula was also issued for pure preserves, jams and jellies, increasing the price for the 1942 pack at the manufacturer level. And a new pricing formula was issued to provide relief for low-cost retailers of pancake and buckwheat pancake flour.

Exemptions from some price ceilings were granted by OPA. These exemptions apply to U. S. Army Rations 1, 2 and 3 and certain canned beef items; sliced and peeled apples; and cleaned and shelled raw peanuts.

Other recent actions by OPA include a rolling back of the squeeze on distributors of Maine sardines by reducing by about 11 percent the maximum prices charged by canners. Administrator Henderson also ruled that standard quality canned tomatoes and peas will be handled through normal distribution channels at a reduction in prices at the canner's level for sales to the trade. A week after announcing a new pricing formula for soup canners, wholesalers and retailers, OPA took steps to relieve the squeeze on wholesalers and retailers handling the products of certain large-volume soup manufacturers.

Regulation No. 10 Is Being Revised

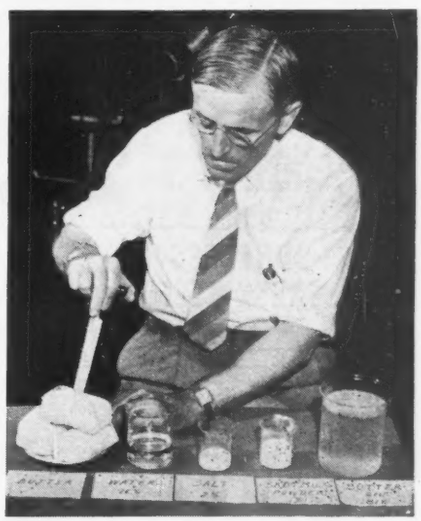
PRIORITIES REGULATION No. 10, the vehicle of the Allocation Classification System, is being overhauled before its use has fairly started. (See FOOD INDUSTRIES, August, 1942, page 39.) There have been so many questions and difficult complications in connection with the operation of the regulation that some simplification has become a necessity.

The changes that are contemplated are not of a character to upset the basic principle of the regulation. What is being sought is a simplification that will make the use of the Allocation Classification System easier to handle both in the field and in Washington.

The new version is being pushed through as rapidly as is practicable.

Dehydrater Priority Rating Omits Boilers

BOILERS for dehydrating plants are not covered by the new high priority rating (AA-3) given for the construction of dehydration plants for processing vegetables, meats and milk. WPB omitted boilers because the new dehydration plants are being prepared for operation on a strictly conversion basis. The plants must be placed where facilities are available and a boiler and adequate water supply are prerequisites.



SOMETHING NEW IN BUTTER

"Butter" can be shipped to tropical countries without benefit of refrigeration on ships or in storage warehouses, according to the Department of Agriculture. Pure butter oil and skim milk powder, two dehydrated dairy products that contain all the food nutrients found in butter, could be shipped to tropical countries and held for a year or more, if desired, and then made into good butter with the aid of a little cold water and salt. C. S. Trimble, butter manufacturing specialist for the Bureau of Dairy Industry, is shown sampling butter made from the specified ingredients.

Swift Develops Meat Dehydrater

Controlled continuous process worked out by company. May be used by other packers

SWIFT & Co., Chicago, has developed a special continuous controlled temperature dehydration process for beef. The process involves precooking of cubed fresh beef at relatively low temperatures, immediately followed by grinding and slow drying. The temperatures are controlled throughout the operation and are low enough to permit further cooking of the dehydrated product in preparation for table use.

The addition of water to the dehydrated beef restores it to the consistency of ground fresh beef, and then in that form it can be served as hamburger, meat loaf, patties, hash or any other type of beef in which ground meat is used.

The new dehydration method was developed by Swift in consultation with technicians of the meat industry, the U. S. Department of Agriculture, and equipment manufacturers. And the method finally adopted was submitted for governmental approval. The process will be protected by patents, but will be made available to meat packing companies who have the proper equipment, without royalty, during the war emergency.

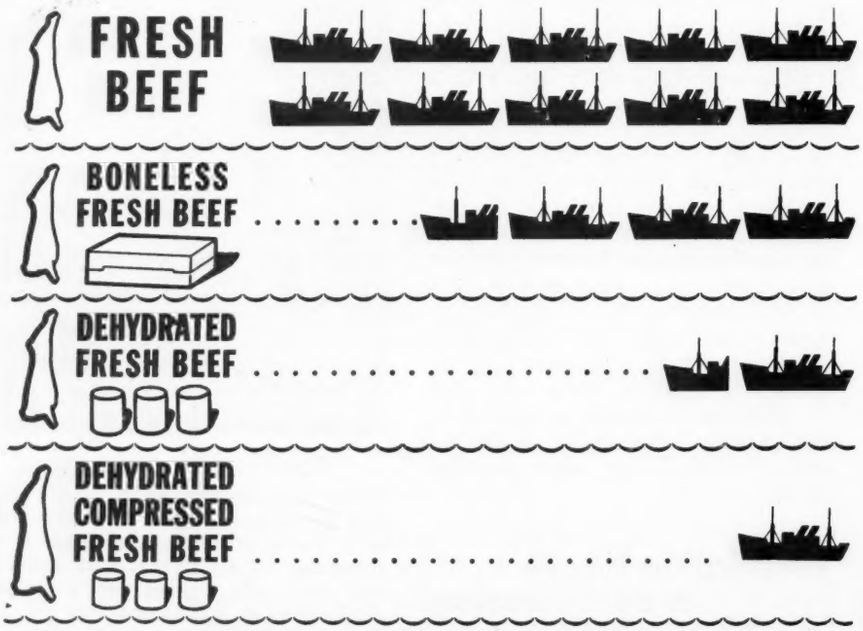
The process was developed in connection with a contract recently awarded to Swift for 80,000 lb. of dehydrated beef for the government. And all production will be taken by government agencies, at least for the present time.

Swift reports that dehydration and compressed packaging saves up to 90 percent of the ship cargo space formerly used to carry and refrigerate fresh beef sides and quarters. Furthermore, the dehydrated product does not require refrigeration on long ocean voyages, and it may be eaten just as it comes from the container, thus being well adapted to field rations.

Army Prefers 100-lb. Bags

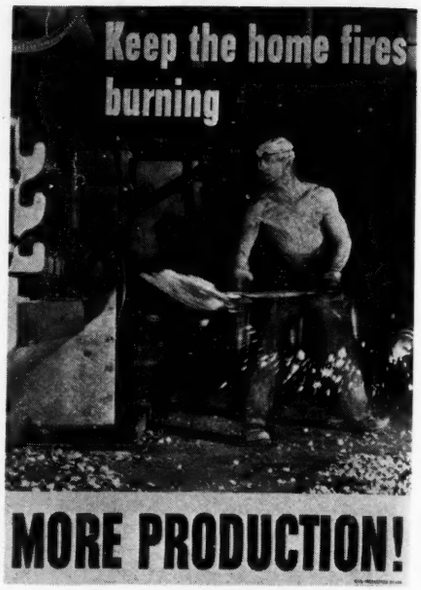
SINCE August 1, the Army is buying all of its flour in 100-lb. (net weight) bags. Since rations are calculated on a per-ton basis, this method of purchase simplifies the ration conversion by the decimal system and also results in a less complicated cost accounting in bread production. Existing contracts for flour are not affected by this change. Overseas flour, which in many instances has been packed in 49-lb. units, will now be sacked in quantities of 50 lb., net weight.

This is but one of many changes being put into effect by the Quartermaster Corps to simplify purchasing and accounting and to improve distribution by following the tonnage system in loading shipping space.



DEHYDRATION AND COMPRESSION SAVE SHIPS

One ship is required for dehydrated compressed fresh beef where ten ships formerly were required before to ship an equivalent quantity of meat. This chart also indicates the relative savings made with boneless fresh beef and dehydrated, but not compressed, fresh beef. The dehydrating and compressing process is equally applicable to beef and pork. This is an excellent example of the ship-saving processing which all food manufacturers should do to facilitate feeding our armed forces and civilians of the United Nations. (See editorial on page 37).



PUT IT UP IN YOUR PLANT

Above is illustrated one of the "More Production" posters which the WPB is urging manufacturers to put up in their plants. A dozen other posters are available, as are also streamers, booklets and leaflets for information stands, motion pictures, radio transcriptions, a bulletin board placard service, material for plant newspapers. This material is available from War Production Drive Headquarters, WPB, Washington, D. C. Effective ways of boosting your plant production through employee morale building are outlined in the "Official Plan Book" of the War Production Drive, which is available to employers.

New Package for Dehydrated Food

Army develops 3-in-1 container which is moisture and insect proof. Withstands submersion

AFTER months of research, the Quartermaster Corps Subsistence Laboratory in Chicago has developed a new "three-in-one" package for dehydrated foods. The new container is moistureproof and offers protection against insects. In addition, it can be submerged in salt water for several hours without damage to contents.

The container, which holds 5 gal., is designed primarily for shipping white potatoes, sweet potatoes, beets and yellow turnips, but it has performed so well under rigid service tests that it shows promise for packaging other dehydrated products. With the new 3-in-1 container, 5 gal. of the dehydrated product is placed inside a laminated bag of glassine paper. This container then goes inside a heavier bag which is insect resistant, and moistureproof. On the outside of this heavy bag is a layer of kraft paper which is

laminated to a thin sheet of lead foil, with an inside layer of vaporproof cellophane. The heavy bag goes inside a solid fiber carton which is weatherproof. Finally, two of these cartons are packed in a single shipping case, either a weatherproof solid fiber case, a nailed wooden box or a wire-banded wooden box.

Food Branch of WPB Revamped

Deputy chiefs appointed, two new sections formed, and old sections regrouped

SEVERAL changes have been made in the personnel of the Food Branch of WPB to streamline its operations and give more efficient service. In addition to appointing A. E. Staley, Jr., deputy chief, Douglas C. Townson has added two assistant chiefs to his staff. The assistants are E. A. Meyer, chief of the Canned Foods Section, and John N. Curlett, chief of the Imported Foods Section.

And for more efficient operation, Mr. Townson has placed the following sections under the jurisdiction of Mr. Meyer: sugar, canned foods, meats, grain products, fishery and dehydration. And these sections have been placed under Mr. Curlett: bread and bakery products, confectioners, distributors, edible oils, restaurant and imported foods.

In addition to these changes, two new sections have been added to the Food Branch, a Dehydration Section, with R. Harry Amenta as chief, and a Fisheries Section, under L. T. Hopkinson.

Barclay Scull has become chief of the Imported Foods Section and Allen Thomson becomes acting chief of the Sugar Section. Merrit Green now heads the Canned Foods Section in place of Mr. Meyer.

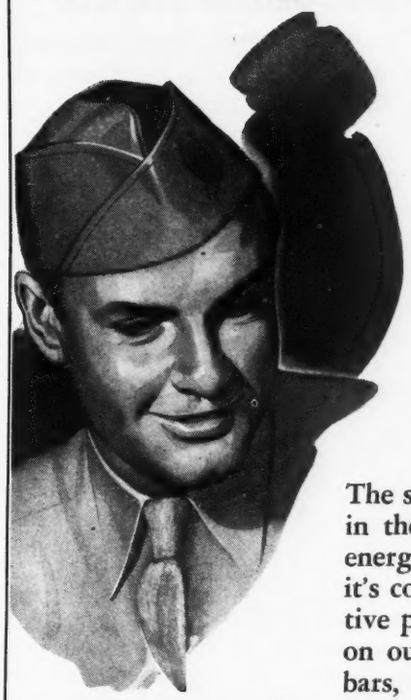
Two members have left the staff. E. J. Fitzpatrick, who had been assistant chief of the Food Branch, has taken a commission in the services of supply of the Army. A. E. Bowman, former chief of the Sugar Section, has gone to Minneapolis as regional director of WPB.

Shrimp Cans Bigger

CANS containing 20 to 30 percent more shrimp are being used for this year's pack as a tin conservation measure. The wet pack can formerly contained 5¾ oz. but now will hold 7 oz., and the dry pack can has been increased from 5 oz. to 6½ oz. This step has been taken voluntarily by the shrimp canners in order to save tin.

Packaged ENERGY

for the front line and production line



The soldier in the field, and the man in the factory, both need plenty of energy to put across the *big job.* And it's coming to them in handy protective packages, turned out by the ton, on our wrapping machines — ration bars, chocolate, hard candy, cereals, crackers, etc. . . . But that's not all—our machines are also wrapping bandages, electric batteries for communication sets, sulfanilamide for first aid, etc.

Many of these machines had to be adapted to new forms of wrapping to meet war needs. . . . Their versatility and quick adaptability made this possible at lowest cost.

If your plant is working on war supplies, we'll do our best to provide you with a new machine. And if you need a machine for *civilian* production, we'll try to put you in touch with a manufacturer who is willing to *sell* or *lease* you a used machine of our make that will meet your needs. We'll also give you information about obtaining the necessary approval from Washington.

Write or phone our nearest office

PACKAGE MACHINERY COMPANY, Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

Mexico: Agencia Comercial Anahuac, Apartado 2303, Mexico, D.F.
Argentina: David H. Orton, Maipu 231, Buenos Aires
England: Baker Perkins, Ltd., Peterborough
Australia: Baker Perkins, Pty., Ltd., Melbourne

A few of the many different products which our machines wrap.

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

HACKNEY SEAMLESS

BARRELS CLEAN

AND EASY TO KEEP THAT WAY!

TODAY'S pressure on production demands equipment that will comply with speed-up requirements. Every minute becomes doubly valuable. Hackney Removable Head Bilged Barrels are helping many shippers because they are easier and faster to clean.

The curvature of the chime in the Hackney container is exceptionally smooth. There are no crevices, seams or welded joints in the interior of the barrel. The Toggle-tite (or single bolt) closure securely holds the head air tight to the top edge, preventing leakage or the entrance of foreign matter. Easy handling is facilitated by the bilged shape of the Hackney container. Hard knocks, transportation abuse are easily withstood by its strong, durable construction.

These and many other advantages have served the food industry for years and have won widespread preference for Hackney Containers. They are the result of years of experience in working with all types of metals, the competent use of modern manufacturing equipment and facilities, extensive research and an intimate knowledge of the user's requirements and the conditions under which Hackney Containers would be used. Today, while there are restrictions on metals, there are no priorities on knowledge, skill, imagination and Hackney's interest in product improvement. These are continuing. These are your assurance of the continued superiority of Hackney Containers.

Hackney

PRESSED STEEL TANK COMPANY

General Offices & Plant:
1457 So. 66th St., Milwaukee, Wisconsin

Containers for Gases, Liquids and Solids

Meat Problem Becomes Acute

Packers suffer from squeeze. Meat shortage is estimated at three billion pounds

Wartime food problems have hit a new high in the meat industry. Many packers find themselves in the economic mire as a result of a squeeze between high livestock prices and low price ceilings, this situation reaching such a state that the nation's independent meat packers have formed a new association for the specific purpose of obtaining some relief. But that is only one phase of the problem. As a result of Army and Lease-Lend demands, the nation faces a meat shortage of 3 billion pounds, though livestock production is at record levels, according to a statement by Roy F. Hendrickson, Administrator of the AMA.

High ceiling prices for meat is seen as one solution, as it would cut consumer buying and also ease the squeeze on packers. But the government apparently does not favor this solution, principally because it would reduce the amount of meat which the lower income groups would be able to put on the table and because of the inflation factor. Ceilings on livestock prices might be another answer, but with the great demand for meat to supply the armed forces and the civilians of the United Nations, especially Russia, the government feels that prices to farmers should be kept up to encourage high production. Subsidies to packers might also help but are not in sight except through government contracts for Lease-Lend and Army supplies. What will be done has not yet been determined, but Mr. Hendrickson talks of rationing, or meatless days, or perhaps a combination of the two. And OPA promises an alternative food price ceiling system by mid-September. Some action seems inevitable.

Four Grade Standards Amended by the AMS

FOUR of the U. S. Standards for grades of processed fruits have been amended by the Agricultural Marketing Administration. Effective on August 1, the amendments apply to the standards for dried apricots, dried peaches, dried prunes and to the tentative standards for processed raisins.

The dried apricot amendment applies to a change in size and changes in tolerances for pits, imbedded dirt, insect infestation, mold, decay or other foreign materials and the inclusion of U. S. Grade D (slabs).

The dried peach amendment applies only to tolerances for pits, imbedded dirt, insect infestation, mold, decay or other foreign material.

The dried prune amendment applies only to tolerances for imbedded dirt, insect infestation, mold, decay, or other foreign material.

The processed raisin amendment changes the tolerance for "B" berries.

DONATES SERVICEMEN'S CENTER

Built and maintained by funds provided by Pepsi-Cola Co., a luxurious canteen and lounge at Times Square, in New York, will be operated in cooperation with the New York City Defense Recreation Committee for the benefit of enlisted men in the armed forces of the United States and United Nations. It is estimated that the canteen and lounge can accommodate 2,500 to 3,000 service men a day. It furnishes, free of charge, lounge rooms with reading and writing facilities; radio; piano; checkroom; shower-rooms; telephone facilities; shaving requisites; stationery; games and other necessities. Beverages are free and foods are sold at minimum cost.

Canners Launch Nutrition Study

Food values of canned foods to be determined by extensive program of research

THE NUTRITION values of canned foods are to be determined by a research program developed by a committee representing National Canners Association. Financial grants for this work have already been made to the University of Arizona and the University of Wisconsin, and others will be made in the near future. The program is financed by National Canners Association and Can Manufacturers Institute.

In the first phases of the program, about 25 products, including fruits, vegetables, and seafoods, will be assayed for six vitamin factors (A, C, thiamin, riboflavin, niacin and pantothenic acid) which are regarded as being of established importance in nutrition. Assays will also be made for important minerals. The products to be studied will be taken from all parts of important sections in which they are canned, and it is estimated that about 30,000 samples will be taken during the course of this year's program.

Assays for vitamins will be made at three universities prominently identified with advances in the knowledge of nutrition, while mineral analyses will be made in laboratories connected with the canning industry.

In addition to vitamin and mineral analyses, support will be given to other studies to be conducted in two other universities. It is desired to determine the effect of storage on vitamin content of representative products and to make a series of correlation tests which will compare the results from methods used for assays and those from standard feeding tests.

Other investigations will have reference to the distribution of vitamins as between solid and liquid content, and the changes which may result from the preparation of foods for the table.

Hershey Gets E Pennant

HERSHEY CHOCOLATE CORP. has received the new joint Army-Navy production award pennant "E" in recognition of outstanding performance on war work. The award was presented to the corporation for the emergency field ration created in its laboratory by Col. Paul T. Logan of the Quartermaster's Department and S. F. Hinkle, chief chemist, and his associates in the corporation.

All employees of the Hershey company have been awarded the special Army-Navy "E" pin.

The Sponsors of Fibber McGee and Molly make good paint, too!

JOHNSON'S

Wax-Fortified

MILL WHITE GLOSS

Made by the makers of Johnson's Wax

Cleanliness Standards Are Easier to Maintain . . .

Now, for food factories, there's a Mill White Gloss that has remarkable dirt repellency . . . and that washes almost as easily as porcelain. Johnson's Wax-Fortified Mill White Gloss is a quality enamel impregnated with genuine wax. It dries leaving a wax-smooth surface of outstanding whiteness. The surface resists dirt and soiling—retains its light-reflective values longer. When washing eventually becomes necessary, it cleans quickly. Maintenance costs are minimized—of vital importance during these times when manpower and materials must be conserved. Write today for new booklet, "The Why and What of Wax-Fortified Paints."

•

Also available—Johnson's Wax-Fortified Dado Enamel and Johnson's Wax-Fortified Machine Enamel.

S. C. JOHNSON & SON, INC.

Industrial Maintenance Division

Dept. FI92 • Racine, Wisconsin

USDA Revamped By Wickard

Department reorganized with eight group administrators to consolidate war effort

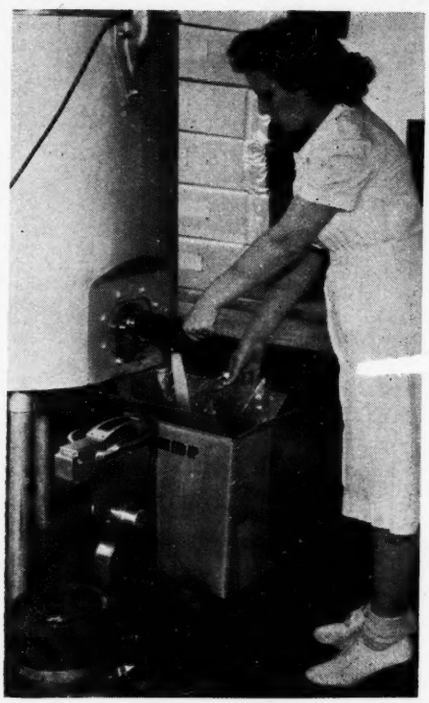
REORGANIZATION of the U. S. Department of Agriculture has been completed. The Soil Conservation Service and the Agricultural Adjustment Administration, together with the Federal Crop Insurance Corp. and the Sugar Division, have been placed under the supervision of the Administrator of the Agricultural Adjustment and Conservation group. All of the Department scientific research agencies have been placed under one head, while retaining their bureau status. This group includes the Bureau of Animal Husbandry, Bureau of Dairy Industry, Bureau of Plant Industry, Bureau of Agricultural Chemistry and Engineering, Bureau of Entomology and Plant Quarantine, Bureau of Home Economics, the Office of Experiment Stations and the Beltsville Research Center.

An agricultural Marketing group has been established consisting of the Surplus Marketing Administration, the Commodity Exchange Administration and the Agricultural Marketing Service (with the exception of the Division of Agricultural Statistics).

At present the eight group administrators are: M. Clifford Townsend, Agricultural Adjustment and Conservation Administrator; C. B. Baldwin, Farm Security Administrator; Roy F. Hendrickson, Agricultural Marketing Administrator; John B. Hutson, president, Commodity Credit Corp.; Earle H. Clapp, acting chief, Forest Service; Eugene C. Auchter, Agricultural Research Administrator; Albert G. Black, Governor, Farm Credit Administrator; Harry Slattery, Rural Electrification Administrator.

The Agricultural Marketing Administration includes the purchase and distribution programs, both domestic and abroad under Lease-Lend, and territorial food programs; market news, inspection and grading services; the administration of various regulatory and market control acts of Congress; marketing agreements; and other related services in the marketing and transportation of agricultural commodities.

Early in April P. V. Cardon was appointed Assistant Agricultural Research Administrator under Dr. E. C. Auchter, the Administrator. Further changes in ARA occurred in June when Dr. Orville E. May, director of the Northern Research Laboratory at Peoria, Ill., was made research coordinator on the staff of Dr. Auchter. Horace T. Herrick, assistant chief of the Bureau of Agricultural Chemistry and Engineering succeeded Dr. May as director of the Northern Research Laboratory and Carl F. Speh took the place of Mr. Herrick in the Bureau of Agricultural Chemistry and Engineering.



IT SAVES METAL

Frozen eggs are being packed in cellophane as a contribution to the metal conservation program. Ordinarily, the eggs, after removal from the shell, are poured into tin cans, holding 30 lb., then frozen and stored. But a score or more of the large egg packers are now putting the eggs into a leakproof cellophane bag inside a special rectangular shaped fiberboard box. The freezing time is said to be comparable with that for the metal containers.

AMA Doubles Purchases

MORE than doubling the volume of the previous month, in June the AMA laid down at shipside, 586,000,000 lb. of farm products and processed foods for delivery to the United Nations. Total deliveries since the start of the program in April, 1941, aggregate 5,769,000,000 lb., costing approximately $806,000,000.

Fruit Storage Adequate

SUFFICIENT cold storage space will probably be available for the 1942 fruit crop, provided the proper use is made of available facilities, according to J. R. Shoemaker, assistant director in charge of the refrigerated warehousing section, Division of Storage, Office of Defense

DEHYDRATION?

"It's in the Bag"—Today!

In these times of critical shortages, the paper bag is coming to the rescue to release tin, metals and other packaging materials necessary for our National Defense Program.

Modern developments are changing the old idea of a paper bag. Scientific advancements in coatings and waxing, and other new materials, make it possible for bags to be used for packaging dehydrated eggs, milk, onions, soups and many other food products never before placed in bags.

Allied's ability to produce all types of moisture and vapor-proof bags, printed in brilliant inks means that your new "bag-package" can be attractive and sparkling with sales appeal. Write us today on your requirements.

ALLIED PAPER BAG CORPORATION

BAYARD & CARROLL STREETS
BALTIMORE, MARYLAND

Transportation. Addressing the annual convention of the International Apple Association at the Hotel Statler, Buffalo, N. Y., Mr. Shoemaker said that the latest survey indicated there were a total of 1,879 refrigerated warehouse plants in the nation, with 766,393,000 cu. ft. of space under refrigeration. Peak holdings of upwards of 5,000,000,000 lb. of food products are indicated, he said.

Outlook Satisfactory For Sugar Allotments

THE GOVERNMENT sugar rationing program is operating on a basis that will make possible the maintenance of allotments to consumers through the first nine months of 1943 at least equal to those at the beginning of rationing, providing the shipping outlook in the Caribbean does not take a radical turn for the worse. This was announced by the OPA on August 13.

It is estimated that 4,173,000 tons of sugar will be required for the first nine months of 1943, with an additional 830,000 tons being kept in the nation's sugar larder to insure an adequate supply in all sections of the country. It is expected that 2,240,000 tons will come from Caribbean sources in the first nine months of 1943; 600,000 tons, from Hawaii; 200,000 tons from the U. S. sugar beet crop in early 1943. These receipts will total 3,040,000 tons, which means that we must go into the new year with at least 1,960,000 tons of sugar on hand.

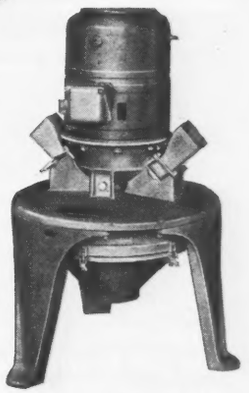
37,000 Dairy Plants To Contribute Scrap

MORE THAN a million pounds of urgently needed scrap metals are expected to be made available to the War Production program as a result of a salvage campaign in the dairy industry. This was announced on August 10 by the WPB Conservation Division.

The campaign, to cover about 37,000 dairy plants throughout the industry, is designed to yield large quantities of critical materials from unused and abandoned dairy processing machinery. A minimum of 30 lb. of scrap from each plant has been established as the collection goal.

Dehydration Increases In British Columbia

DEHYDRATION of foods in British Columbia has already made considerable development since the outbreak of the war, and further sharp expansion is anticipated. A number of plants are now being expanded and some new plants are proposed.



"ENTOLETER" shown above handles 15000 pounds per hour. "Entoleters" also available to handle 2000, 5000 or 10000 pounds per hour.

Kill to stay Killed—with the

ENTOLETER
INFESTATION DESTROYER
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A CONTINUOUS Process Proven 100% Effective

For CONTINUOUS Protection to Your PLANT

"ENTOLETE" grain, blending stocks or all other raw materials—as the first process

AND

For CONTINUOUS Protection to Your FINISHED PRODUCTS

"ENTOLETE" all finished products as the last process directly ahead of packaging operation.

INEXPENSIVE • EASY TO INSTALL AND OPERATE • MINIMUM MAINTENANCE

Prompt deliveries can be made NOW. Write us about your problem.

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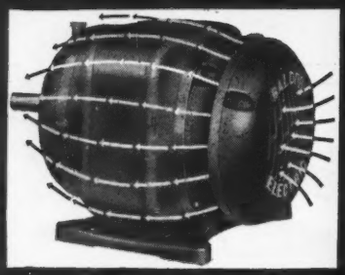
The Safety Car Heating and Lighting Company, Inc.
230 Park Avenue **New York, N. Y.**

"ENTOLETER," our registered trade-mark, identifies our insect infestation destroying equipment.

TOTALLY ENCLOSED (DUST-PROOF) MOTORS AT NO EXTRA COST



Illustrating forced-air cooling over entire exterior of motor frame.

BALDOR offers you totally enclosed, dust-proof motors of Streamcooled design in integral sizes at same prices as standard motors.

When you specify BALDOR, you get Special Motor features at NO EXTRA COST to you.

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Write us, mentioning "FOOD INDUSTRIES."

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ST. LOUIS, MO.
Representatives in Principal Cities

21 YEARS

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BETTER MOTORS

War Production Board Orders

Freezing, Dehydrating Equipment—Persons engaged in freezing, dehydrating, or fresh packing of fruits and vegetables have been assigned the same preference ratings as canners for material and machinery needed for repair, maintenance and expansion of their plants, according to Preference Rating Order P-115 issued July 29. A-1-a has been assigned for emergency maintenance or repair; a-1-c for replacement, addition or expansion; a-1-j for normal maintenance, repair and operation.

Coffee, Tea Quotas—Supplementary Orders M-135-c (Coffee) and M-111-d (Tea), issued July 30, granted increases ranging from 10 to 100 percent in quotas for 204 counties in 42 states and the District of Columbia. The increases, effective in August, fix monthly quotas of 75 percent for coffee and 50 percent for tea, based on average monthly deliveries during corresponding quarters of 1941.

Sugar—An Amendment to Supplementary Order M-98-a, issued July 29, provides for the entire year's allocation to American refiners of raw cane sugar, both imported and domestic. The new order makes two changes in the raw sugar allocation program: It brings the domestic cane, grown in Louisiana and Florida, into the allocation program, and it requires specific authorization from WPB to receive Hawaiian sugar coming to the East Coast. However, the raw sugar allocated for the last three months of 1942 is substantially at the same rate as the allocation for the first nine months.

Dehydration Production Facilities—WPB Requirements Committee, to increase production of dehydrated foods for the armed services and Lease-Lend, has determined that a high priority rating (AA-3) may be assigned to the delivery of a considerable quantity of material and equipment to be used during the last half of the year to expand present facilities. The following quantities of critical metals were set aside for dehydration equipment: 5,229 tons of iron and steel, 271 tons of copper, 28 tons of zinc, 7.4 tons of tin, 8.5 tons of nickel, 10.8 tons of lead and 3.5 tons of aluminum.

Tea—Except as specifically authorized by WPB, no wholesale receiver can accept any deliveries of tea which increase his inventory in excess of a practicable minimum working inventory. Amendment No. 2 to Order M-111 instructs packers to report, within 10 days after the close of each quarterly period, the total quantities of any quota-exempt deliveries of tea made by him during that period.

Raisins—A shortage of raisins for defense, for private account and for export made necessary Order M-205-a, restricting purchase or delivery of more than 100 lb. of raisin-variety grapes harvested or picked after August 24, 1942, for any purpose other than conversion into raisins. Raisin-variety grapes may be purchased or delivered for purposes other than conversion into raisins in some cases, when the grower has made specific application on Form PD-626 giving information in compliance with instructions in the order.

Press Association, Inc.

BACON FOR THE ARMY

Large slabs of bacon for the U. S. Army, hanging in a Chicago packing plant. This bacon is sliced and packed in tin cans under vacuum to keep it in good condition for long periods under adverse conditions. At the right may be seen some of the cans and the machine used in vacuum packing.

Dried Fruit—The entire 1942 production and the carryover from the 1941 crop of dried apples, apricots, peaches, pears, prunes and grapes (raisins) was frozen in the hands of packers by Order M-205, issued August 10, to make them available for the armed forces and Lease-Lend. Under terms of the order the supply not purchased by the government will be available for civilians.

Cans for Tomato Pulp, Purée—Unlimited packing of tomato pulp or purée in small as well as large cans (made of tinplate or terneplate) for the remainder of the season was authorized by an amendment to Order M-81, issued August 6. Although a revision of the order permitted limited quantities for large size cans only, WPB issued the amendment because canners had made extensive arrangements regarding machinery, cans and labels to pack the pulp and purée in smaller cans. Tomato sauce may also be now packed in smaller cans with certain exceptions recorded in the Order.

Rubber-sealed Closures — Manufacturers whose normal business consists only of packing those products for which rubber-sealed closures were barred by Order M-119 are now permitted to use inventories of such closures which were manufactured by April 19, in Amendment No. 1 to the Order, issued August 5. The amendment also adds home-style processed pickles to the list of food products that may not be packed with rubber-sealed closures. Packers may, however, use existing inventories of closures designed for use on home-style pickle jars.

Rubber — Further restrictions on civilian products to conserve the use of rubber were set forth in Amendment No. 9 to Order M-15-b-1, which is expected to save from 300 to 400 tons of crude rubber per month. Under the amendment issued July 21 are listed revised specifications for milk and milking machine equipment, hog scraper paddles, belting (which includes conveyor pulleys for fruits and vegetables), pipe coupling rings, rubber lined tanks, drums and rubber protected industrial equipment.

Cellophane Window Cartons—Cellophane window cartons for food products are now permitted by Amendment No. 1 to Order L-20. While these cellophane window cartons were prohibited under the original order, the cellophane overwrap that was permitted to protect certain products consumed more critical material than the window carton.

Blackplate—Use of blackplate for cans has been limited to a small list of essential products, similar to the list issued for tinplate and terneplate, in Order M-136, issued July 22. Two classes of products may still be packed in blackplate, those in Table A (essential for military and civilian operations) which include dry modification of milk, including malted milk, and baking powder, and those in Table B—products packed under terms of Order M-81, for which limitations have been specified. Blackplate cans for dry modification of milk may be made in 4 sizes until Sept. 30, after which date the product is not to be packed in cans. Baking powder cans are to be made of fiber with blackplate ends.

There's a
VILTER
Engineer
near by and
willing to serve YOU!

Before American men can build the planes, tanks, guns, and boats that are going to *win* this war, they must be well fed.

Your job is to keep your equipment at its peak performance level, to supply them with the fresh healthful food that will give them the energy needed to perform the tasks that we, as Americans, have to do.

Have a VILTER Engineer check your refrigeration system for its efficiency . . . even though it may not be a Vilter installation.

We've a job to do . . . You've a job to do. Let's get together!

There's a VILTER *Engineer near by and willing to serve* YOU!

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Superior Since 1867
VILTER
Air Conditioning
Refrigeration . . .

Nutrition Group Gets New Funds

Latest subscriptions total $75,000. Nutrition journal founded. Patent policy set

IMPORTANT progress in the work of the Nutrition Foundation, Inc., an organization sponsored by food manufacturing concerns, has been announced by George A. Sloan, president. Mr. Sloan reports that new subscriptions amounting to $75,000 have been received from six new member organizations. These, with previously announced subscriptions, bring the foundation's funds for the support of nutrition research to the total of $923,500.

Another development has been the founding of *Nutrition Reviews*, a monthly journal of interpreted progress in the science of nutrition. Dr. Frederick J. Stare, assistant professor of nutrition and biochemistry at Harvard University, was named editor of the new publication.

The foundation has also adopted a patent policy, recommended by Dr. Karl T. Compton, chairman of the board, for making the foundation's research findings available with full protection of the public's interest.

INSPECTORS LEARN ABOUT WAR GASES

E. J. Hetherington, supervising inspector of foods, Inspection Division of the City Comptroller's Office, New York, looks on while Thomas Cahill, office manager, sprays harmless war gas simulations donated by Fritzsche Bros., Inc., for training the city's food inspectors in identification of poisonous war gases. The war gas simulations are part of a kit devised by Fritzsche and distributed with OCD approval to defense agencies and war gas instructors throughout the country.

Canned Fruit Cocktail Standards Promulgated

REGULATIONS establishing standards of identity and prescribing label statements of optional ingredients for canned fruit cocktail have been promulgated by the Federal Security Administration. Effective October 19, 1942, the regulations are essentially the same as the proposed regulations, with the exception of minor clarifying changes in the terminology.

The standards were published in the *Federal Register* of July 21. Copies may be obtained from the Superintendent of Documents, Washington, D. C., at 10 cents each.

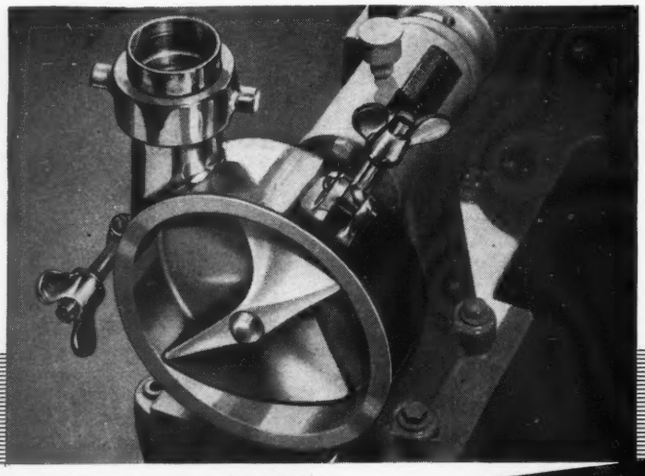
AMS Issues Standards For Dried Pear Grades

TENTATIVE U. S. standards for grades of dried pears have been developed by the Agricultural Marketing Administration, and became effective August 1.

These standards serve as a convenient basis of sale and wholesale transactions and as the basis for determining loan values or hypothecated stocks. They will also form the basis for the federal grading service.

Accident Rates Rise In Food Industries

ACCIDENT prevention slumped severely last year in the food industries. The accident frequency rate went up 15 percent, and the severity rate increased



"GENTLE PUSH" action prevents agitation and foaming

"Gentle Push" action is an exclusive feature of Tri-Clover Pumps. The famous patented one-piece impeller produces a gentle, even flow without pulsations or agitation. These pumps are ideal for milk, ice cream mix, fruit juices, tomato juice, corn, syrups, wines, beer, alcohol, etc.

16 models ranging from ¾" to 6" sanitary or iron pipe connections, in maximum capacities from 100 to 42,000 gallons per hour. Furnished complete with splash-proof motor. Write for catalog and price list.

TRI-CLOVER Sanitary Pumps

TRI-CLOVER MACHINE CO. · KENOSHA, WIS.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded August (thousands)	Total Awarded 1942 (thousands)
Bakery	.....	.....	$50
Beverages	.....	$150	1,377
Canning and Preserving	$40	.....	355
Cold Storage Plants	45	.....	405
Confectionery	.....	.....	.....
Grain Mill Products	80	.....	435
Ice Manufactured	.....	40	180
Meats and Meat-Products	40	.....	183
Milk Products	370	330	1,402
Miscellaneous	1,965	240	3,911
	$2,540	$760	$8,298

SCHEDULE OF EVENTS

SEPTEMBER

1–Nov. 6—Siebel Institute of Technology, 53rd course in Milling and Baking Technology, Chicago, Ill.
7–11—American Chemical Society, Agricultural and Food Division, Hotel Statler, Buffalo, N. Y.
28–30—National Coffee Association, annual convention, White Sulphur Springs, Va.
29–Oct. 1—Technical Association of the Pulp & Paper Industry Session on wartime paper products and packages, Statler Hotel, Boston, Mass.

OCTOBER

2–6—American Meat Institute, 37th annual meeting, Drake Hotel, Chicago, Ill.
5–Dec. 23—University of Wisconsin College of Agriculture, Dairy Industry Winter Course, Madison, Wis.
10–17—National Dairy Association, Memphis, Tenn.
14–16—National Association of Retail Ice Cream Manufacturers, Inc., Chicago, Ill.
19–21—International Association of Ice Cream Manufacturers, Peabody Hotel, Memphis, Tenn.
19–22—American Dietetic Association, 25th annual meeting, Hotel Statler, Detroit, Mich.
19–24—National Frosted Foods Week.
25–31—National Honey Week.
27–29—National Safety Council, 31st Safety Congress and Exposition, Sherman, La Salle and Morrison Hotels, Chicago, Ill.

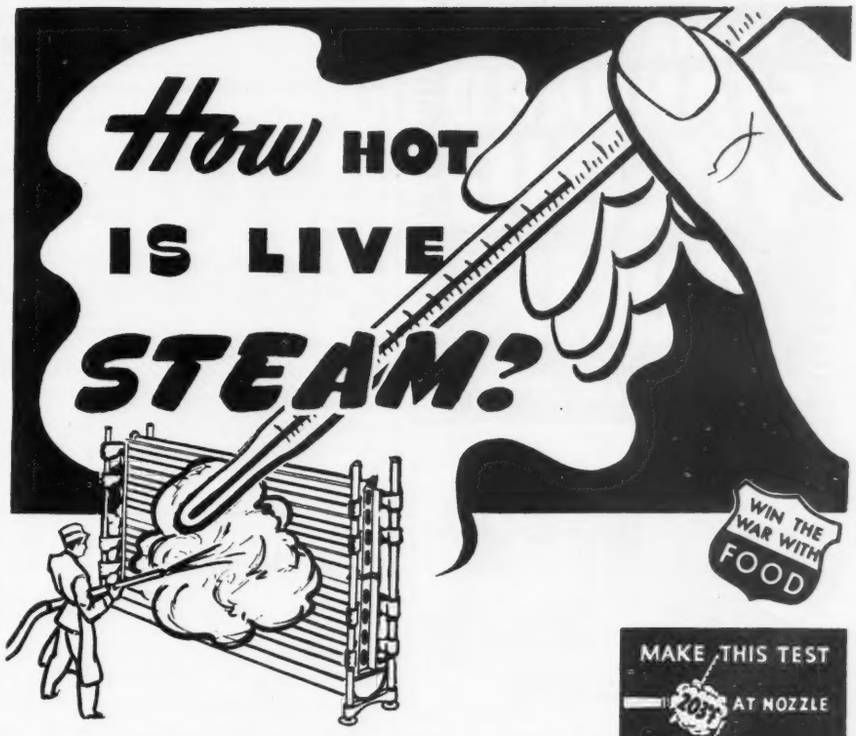
44 percent. The extent to which these increases are out of line with the accident trends in industry in general is reflected by the fact that the "all industries" frequency rate increased only 8 percent, and the severity rate decreased 8 percent. These data on accident rates were reported by National Safety Council in its annual pamphlet "Accident Rates in the Food Industry," for 1941.

Candy Plants To Make Radio Equipment

CHOCOLATE FACTORIES will soon be making radio detection equipment for the Army and Navy. The reduced cocoa supply is making available for war plant work space and workers formerly devoted to the manufacture of chocolate candy. And the conversion section of the WPB food branch is working with the Tobe Deutschmann Corp., Canton, Mass., to convert part of the candy industry to war work.

Can Salvage Program Greatly Expanded

PREVIOUSLY confined to 36 major metropolitan areas, the tin can salvage program is being enlarged to include 104 additional cities, it has been announced by the Conservation Division of WPB. This extension is made to meet the increased estimate of some 250,000 to 400,000 tons in detinning plant capacity for the coming year. This increase in capacity is the result of plant expansion and the diminishing supply of commercial tin plate trimmings, which have absorbed the greater part of the country's detinning facilities.



Actual tests reveal that live steam, as usually applied is NOT hot enough to kill food spoiling bacteria!

Authorities on sanitation agree that a temperature of 170°–180°F maintained for two to five minutes is required to kill food spoiling bacteria. Actual tests reveal, however, that while the temperature *within* a steam hose may be over 200°F, it drops below 136°F just a bare 12 inches from the outlet. Furthermore, while re-cooling steam treated equipment, conditions are ideal for the rapid growth of bacteria.

How hot is steam? Just place a thermometer at varying distances from the nozzle of a steam hose and see for yourself.

Damage to plant and equipment caused by steam or even hot water is also a serious drawback. The constant throbbing of live steam in a vat of water soon opens up seams, loosens fittings, brings on costly repairs. Wide fluctuations in temperature impose a similar penalty when coolers, freezers and other equipment are treated with steam. Painted walls blister and peel through constant exposure to steam.

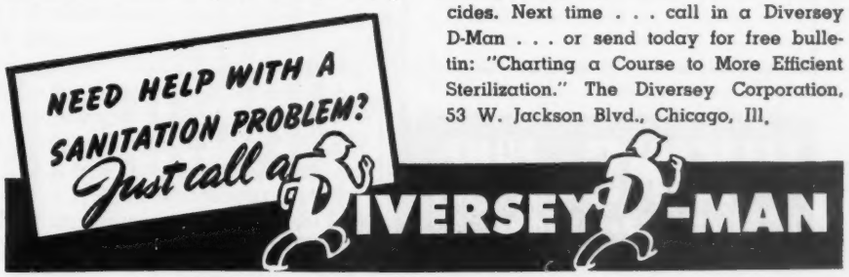
Diversol the Ideal Bactericide

The handicaps of steam can be avoided and effective control of food spoiling bacteria, mold and yeast obtained by the use of DIVERSOL. Although powerful and quick-acting, DIVERSOL will not corrode or damage equipment, thus avoiding undesirable metallic off-tastes or disinfectant odor. It is the ideal bactericide for the food plant.

DIVERSOL comes in pure white, readily soluble crystals of uniform, fixed strength. Simply add to water and this streamlined bactericide is ready for action . . . just rinse or spray the previously cleaned equipment. There is no sludge, no muss, no film, no scale.

Diversey D-Men At Your Service

With stocks of many raw materials limited, the problem of avoiding spoilage becomes increasingly urgent. Maximum output must be obtained from supplies available. The Diversey D-Man is well qualified to help you solve spoilage and similar sanitation problems. Furthermore, he is backed by Research Laboratories that have spent over 18 years developing special purpose cleaners and bactericides. Next time . . . call in a Diversey D-Man . . . or send today for free bulletin: "Charting a Course to More Efficient Sterilization." The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.



PEPHAPS THIS
STANDARD
VIKING
PUMP
WILL DO THE WORK

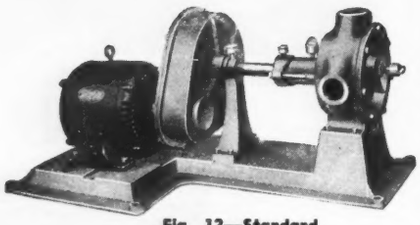


Fig. 12—Standard Gear-Driven Pump

★

Valuable time in securing materials and in production often can be saved when you order a "standard" Viking Rotary Pump, instead of a "special." In addition, you help conserve vital steels and alloys.

Consult your nearest Viking representative, or the factory, in regard to your War-time rotary pump problems. Suggestions may be offered to speed up delivery time many weeks. Also send for *free* 44-page catalog showing many standard models and sizes of Viking Rotary Pumps . . . Write today.

WHEN ORDERING PUMPS OR PARTS, PLEASE GIVE US YOUR PRIORITY RATING AND ALLOCATION SYMBOL. Be sure to obtain the highest rating possible. Check up to see if recent priority changes have improved your rating.

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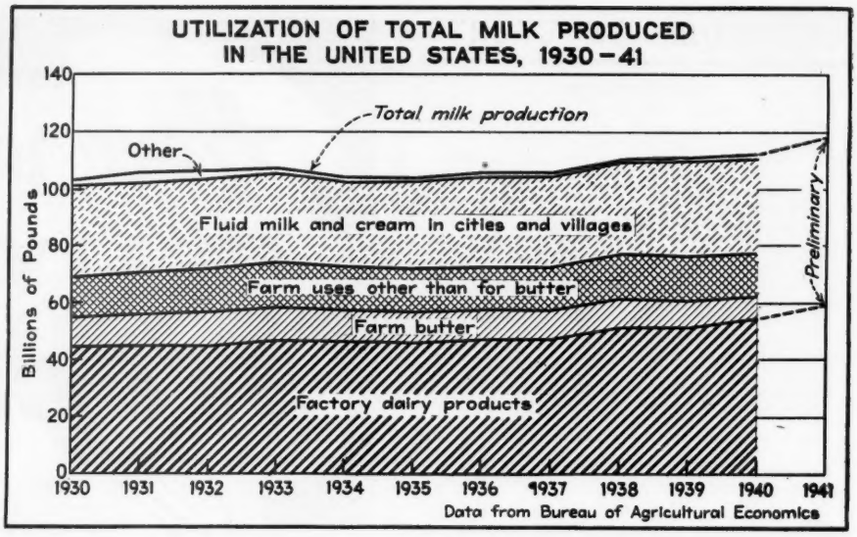
VIKING PUMP COMPANY
CEDAR FALLS, IOWA



Crop Prospects Best On Record

ACCORDING to the Crop Reporting Board of the U. S. Department of Agriculture, growing conditions this year are the best on record, and the prospects on August 1st were that the total volume of food crops harvested this year will be in excess of the pre-drought average by 21 percent. In addition, it is expected that this year's combined yield will exceed that of last year by about 9 percent. This, although falling short of the department's goal of 15 percent increase, is nevertheless a great jump forward.

All field crops except rice and sweet potatoes are expected to exceed the July 1, 1942, estimates. Corn, now estimated at 2,754,000,000 bu., is 126,000,000 bu. over the July 1 estimate and is larger than any corn crop since 1932. Wheat production is estimated at 955,000,000 bu., second only to the record crop of 1915. The oat crop is forecast at 1,332,000,000 bu., the largest crop since 1925. Barley output, at 417,000,000 bu,. will be 16 percent higher than the previous record, while rice at 74,000,000 bu., is expected to be 35 percent above the next nearest figure. Rye is also expected to make a new record, at 59,665,000 bushels.

Production of oil-bearing seed crops is now expected to be considerably higher than previous estimates. Compared to output last year, the following gains are forecast: Cottonseed, 22 percent; soybeans, 74 percent; peanuts, 90 percent.

Dry edible bean production for this year is now put at 20,596,000 bags, compared to 18,788,000 bags last year and to a 1930-1939 average of 13,297,000 bags. Dry peas are placed at 7,028,000 bags, up from 3,788,000 bags last year.

Potato production in 1942 is forecast at 378,175,000 bu., compared to 357,783,000 bu. in 1941, while sweet potatoes are expected to yield 67,523,000 bu., up from 63,284,000 bu. last year.

Fruit yields are still expected to total about 3 percent below 1941 crops, although well over the 1930-1939 average. Apple production, not previously estimated for 1942, is put at 122,215,000 bu., almost exactly equal to 1941 output.

Food Prices Still Rise

WHILE commodity prices in general have been declining in recent weeks under the pressure of OPA regulation, food commodity prices, largely uncontrolled, showed increases in some instances. The weekly index of commodity prices of the *New York Journal of Commerce*, which stood at 103.6 on June 13, 1942, rose to 14.4 by July 18 and, on August 15, had fallen again to 13.5. The same publication's index for food prices, was 105.5 on July 18 and had fallen slightly to 105 by August 15, comparing to 105.1 on June 13. The grain index in the same series, at 89.6 on June 13, was 86.6 on July 18 and rose again to 89.0 on August 15, 1942.

Spot prices of foods, in the four weeks from July 18 to August 15, 1942, showed some increases and some decreases, although many food commodities were steady under ceilings. Wheat, No. 2, hard winter, Kansas City, at $1.02½ on the earlier date, rose to $1.12. Corn, No. 3, yellow, Chicago, in the same period fell from 84¢ to 83¢. Flour, in the four weeks, increased from $6.00 to $6.05. Among the meats, beef fell from 20½¢ to 20¢, lamb rose from 25½¢ to 26¢, and pork lions were unchanged at 28¢. Lard increased 10¢, from $12.75 to $12.85. Eggs rose from 34¾¢ to 35½¢, while butter jumped from 37¾¢ to 41½¢, principally because of government support of the market. Cheese was steady at 27½¢. Among the imported foods, coffee, cocoa and sugar were unchanged under ceilings. Vegetable oils and canned foods were also unchanged.

INDICATORS

Sugar beet crop in the United States this year is expected to be around 12,967,000 tons of beets, a new record, up 26 percent above 1941 output.

Sugar cane production in the United States this year is expected to reach 7,379,000 tons of cane, compared to 4,926,000 tons last year.

Lamb crop in the spring of 1942, at 32,260,000 head, was the second largest on record, and was only 2 percent below the 1941 record high.

Pea pack in Indiana in 1942 nearly doubled the 1941 output and was 43 percent above the goal set for the State by the U. S. Department of Agriculture. The total pack this year was about 1,000,000 cases.

Flour production in June, 1942, by mills accounting for 65 percent of U. S. output, as reported by *The Northwestern Miller*, was 5,417,415 bbl., compared to 5,588,652 bbl. in June, 1941.

Green pea production for canning and freezing in 1942 is now reported to have been 463,890 tons, compared to 345,270 tons in 1941, and to a 1931–1940 average of 209,740 tons.

Snap bean production for canning and freezing this year is expected to reach 172,900 tons. Last year the total was 132,020 tons and the 1931–1940 average was 84,200 tons.

Evaporated milk production in June, 1942, totaled 402,584,000 lb., compared to 350,073,000 lb. in June, 1941, and was 49 percent over the 1936–1940 average June output.

Condensed milk production in June, 1942, was 6,782,000 lb., 38 percent below production in June of last year, but 63 percent over the 1936–1940 average June output.

Skim milk powder produced in June, 1942, was 79,600,000 lb. In June, 1941, the output was 56,038,000 lb. The average June production in 1936–1940 was 48,000,000 pounds.

Whole milk, dried, produced in June, 1942, was 6,100,000 lb., up 37 percent above the June, 1941, output and 137 percent above the average production in June, 1936–1940.

Butter, creamery, output in June, 1942, totaled 203,860,000 lb., 29 percent under production a year earlier, but 34 percent above the average June figure in 1931–1940.

Butter, creamery, output, first half of 1942, totaled 936,710,000 lb., 6.9 percent below the corresponding period of 1941, but 5.6 percent over the average output in 1931–1940 for the same months.

Cheese, American, produced in June, 1942, amounted to 109,900,000 lb., compared to 85,003,000 lb. a year earlier and to an average of 61,991,000 lb. for June in 1931–1940.

Cheese, American, produced in the first half of 1942 totaled 497,025,000 lb., 45.8 percent above the 1941 output for the like period and 108.6 percent over the average for the first six months in 1931–1940.

Oleomargarine sales in June, 1942, as indicated by the sales of internal revenue stamps, totaled 23,617,308 lb., 3.1 percent below sales in June, 1941. For the first six months of 1942, sales were 166,153,432 lb., 7.7 percent below the same period of 1941.

Milk sales, fluid, in June, 1942, as reported by Milk Industry Foundation, were 10.75 percent over sales in June a year earlier.

Eggs, packed in liquid form in June, 1942, totaled 84,517,000 lb., up 70 percent above the 49,709,000 lb. packed a year before.

Eggs, whole, dried, in June, 1942, totaled 20,685,930 lb., an increase of 1926 percent over the output of June, 1941.

Fruits, frozen, in storage on August 1, 1942, totaled 185,077,000 lb., compared to 200,268,000 lb. on August 1, 1941, and to an average in 1937–1941 of 150,339,000 lb. for the date.

Vegetables, frozen, in storage on August 1, 1942, totaled 83,932,000 lb., compared to 73,144,000 lb. on the same date last year.

Butter, creamery, in storage on August 1, 1942, was 148,637,000 lb., compared to 178,493,000 lb. on August 1, 1941, and to an average of 152,885,000 lb. on August 1 in 1937–1941.

Cheese, all kinds, in storage on August 1, 1942, amounted to 295,672,000 lb. The figure a year earlier was 168,420,000 lb., and the August 1 average in 1937–1941 was 135,744,000 pounds.

Eggs, case equivalent, in storage on August 1, 1942, equaled 15,481,000 cases, compared to 11,846,000 cases a year before and to an average for the date in 1937–1941 of 11,565,000 cases.

Poultry, all kinds, in frozen storage on August 1, 1942, was 79,165,000 lb., compared to 81,206,000 lb. on August 1, 1941, and to an August 1 average in 1937–1941 of 70,244,000 pounds.

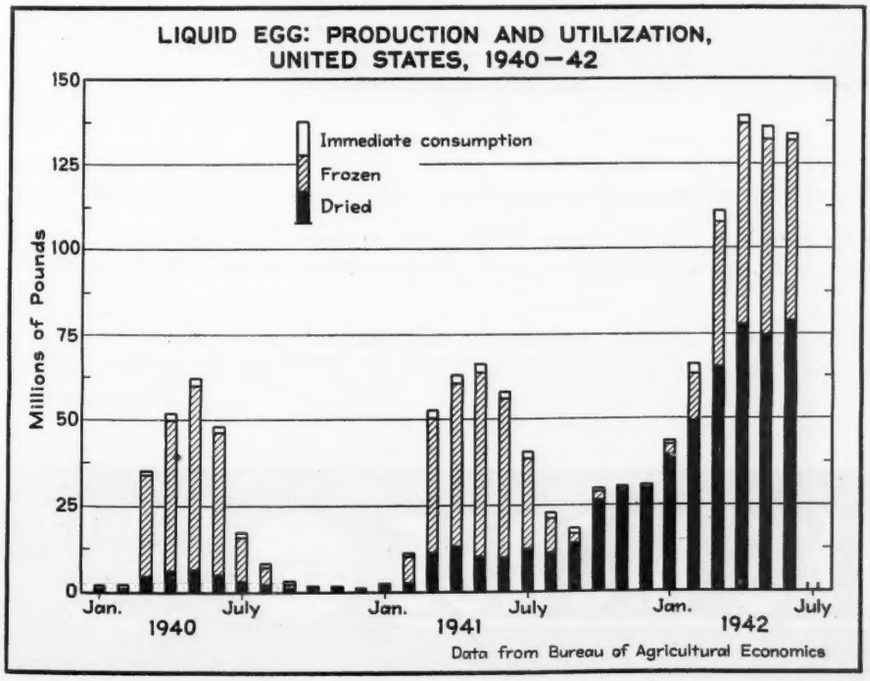
Meat, all kinds, in cure and frozen storage, on August 1, 1942, totaled 629,262,000 lb., compared to 761,284,000 lb. on August 1, 1941, and to an average of 609,606,000 lb. for August 1 in 1937–1941.

Lard in storage on August 1, 1942, was 88,689,000 lb., and rendered pork fat on the same date totaled 10,458,000 lb. The combined figure for the two products one year before was 102,260,000 lb., and the average for August 1 in 1937–1941 was 212,788,000 pounds.

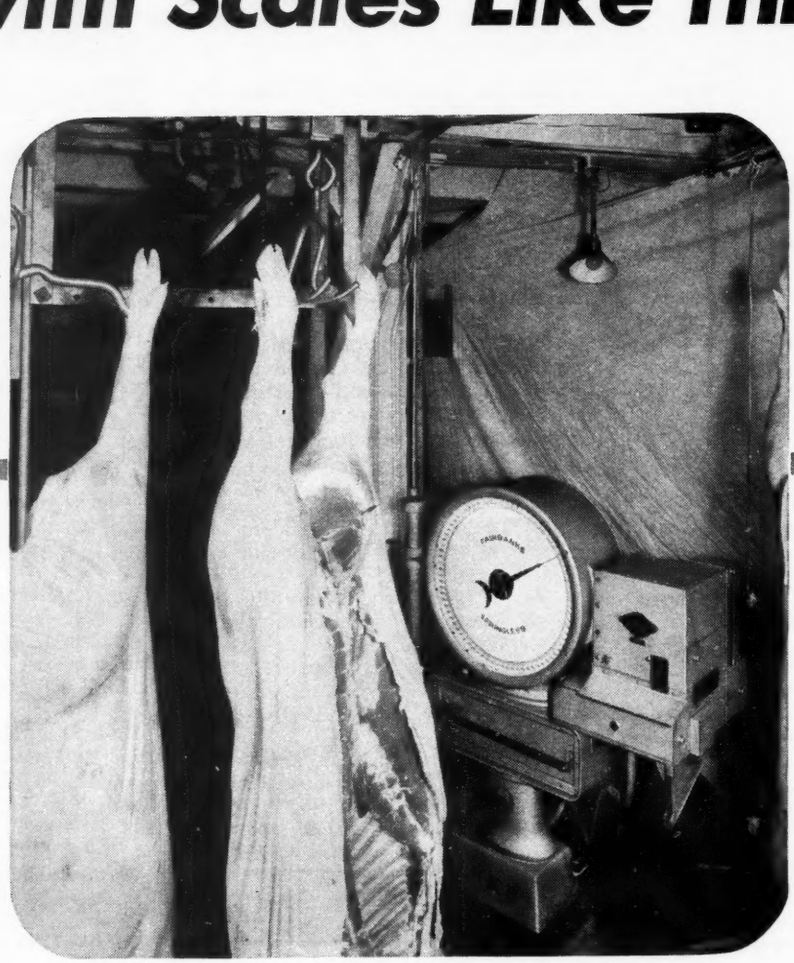
Weekly wholesale price index of foods, as compiled by Dun & Bradstreet, was reported on August 14, 1942, at $3.76, a new high for the last 17 years, and comparing with $3.19 a year before.

Business activity index of *Business Week* stood at 184.2 on August 8, 1942, compared to 182.7 a month before and to 159.8 a year ago.

Cost of living index of National Industrial Conference Board was 97.5 at the end of July, compared to 97.3 a month earlier and to 88.9 a year before.



America Fights the Clock with Scales Like This!



PRECIOUS minutes can be saved with modern Fairbanks Scales.

This Fairbanks Hog Grading Scale achieves speed and accuracy in weighing 200 to 540 hogs per hour. It automatically makes triplicate printed records of each weight.

Use your priority to secure Fairbanks Scales that will not only save time *now,* but in years to come. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

FAIRBANKS-MORSE

SCALES
DIESELS
MOTORS
PUMPS

MEN · JOBS · COMPANIES

INDUSTRY

B. C. Sugar Refining Co., Ltd., Vancouver, B. C., will spend approximately $21,000 on alterations and additions to its raw-sugar warehouse at Vancouver. The new warehouse equipment will include an overhead crane and structural alterations.

Canadian Fishing Co., Ltd.'s $100,000 cannery at Lagoon Bay, Queen Charlotte Islands, B. C., was nearly destroyed in a fire which recently swept the plant from the wharf to the shoreline. The four-line cannery was capable of canning 3,000 cases of salmon daily.

Denison (Tex.) Egg and Poultry Co. has opened one of the largest egg drying plants in the country at Birmingham, Ala., with a daily capacity of 3,000 cases. All production will go into Lease-Lend and government use.

General Foods Corp., New York, is taking over the canning plant in the Bahamas formerly owned by Axel Wenner-Gren, Swedish financier. The property was confiscated by the Bahaman government after the U. S. blacklisted the firm for dealing with enemy nations. Under Wenner-Gren operation, the plant processed canned vegetables and canned and frozen crayfish.

Oxnard Canners is constructing a new fish canning plant at Monterey, Calif., to replace the plant completed last October which was taken over by the government. Equipment has been rushed to the new location to start production as soon as possible.

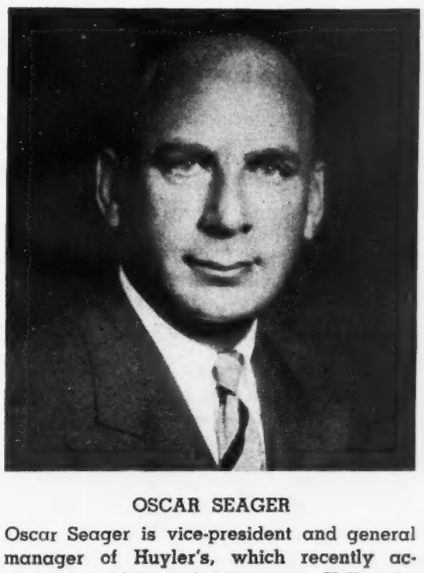
Pillsbury Flour Mills Co., Minneapolis, Minn., is constructing a new laboratory in that city, to house an expanded wheat selection and testing department, and a complete modern bakery.

Quaker Oats Co. has acquired the dog food plant of Chappel Brothers, Inc., Rockford, Ill. No change in management or personnel is expected, with Frank Warton continuing in charge of the business.

Sardik Food Products Corp., New York, has completed its new dehydrating plant in Lockport, N. Y., and has begun operations with the greatly expanded dehydration facilities installed there.

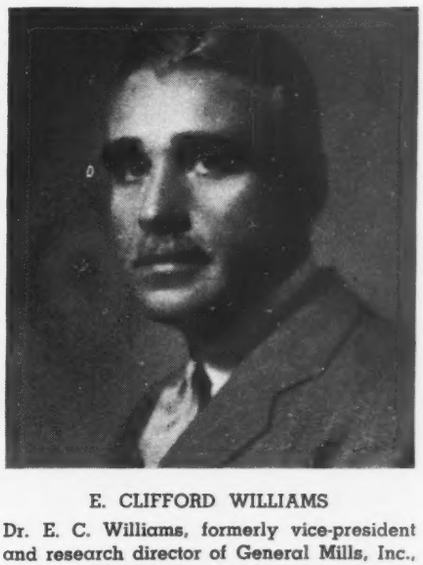
Sheridan (Wyo.) Creamery Co. has opened in Sheridan the first cheese factory in northern and eastern Wyoming, to have a daily capacity of 850 lb. of cheese. Cost of the plant was $20,000.

Stickney and Poor Spice Co., Boston, Mass., is conserving war materials in its mustard package by using a glass cap held in place by a clip which uses a minimum of wire. The glass-cap package makes an attractive counter display and has re-use value as a table jar.



OSCAR SEAGER

Oscar Seager is vice-president and general manager of Huyler's, which recently acquired a substantial interest in Holbrooke Candies, Inc., Brooklyn, N. Y. The president of Holbrooke Candies, Philip F. Cohen, was formerly president of Happiness Candy Stores when Mr. Seager was in charge of the five Happiness Candy factories. This move brings together two men who have long been prominent in the candy business.



E. CLIFFORD WILLIAMS

Dr. E. C. Williams, formerly vice-president and research director of General Mills, Inc., Minneapolis, Minn., has been appointed vice-president and director of General Aniline and Film Corp., New York, which was taken over by the United States Treasury Department last February and placed under the jurisdiction of the Alien Property Custodian because of its connection with the German dye trust, I. G. Farben.

Texas Chemurgic Industries has opened a dehydration plant in Bowie, Tex., at a cost of $50,000, to dehydrate Irish and sweet potatoes, carrots, onions and other products. The manager is R. E. Roberts.

N. B. Updike Elevator Co.'s plant at Fremont, Neb., was recently destroyed by a fire which also damaged 100,000 bu. of new wheat. The loss was estimated at $200,000.

PERSONNEL

Searing W. East, American Bakers Association assistant general counsel, assistant secretary of the committee on public relations, and editor of the ABA monthly bulletin, has been permanently assigned to the association's new Washington office where he will work with William A. Quinlan, general counsel.

Dr. Lucius W. Elder has been appointed director of the physical chemistry section, Central Research Laboratories of General Foods Corp., Hoboken, N. J. Dr. Elder joined the staff of Post Products Division's laboratories at Battle Creek in 1932 and was transferred when the central laboratory was organized.

Herman L. Heide, vice-president and director of sales of Henry Heide, Inc., New York, has been named to the national Wage and Hour Committee as representative of the Association of Manufacturers of Confectionery and Chocolate of New York State.

L. P. Hicks, Livingstone, Mich., of Parker & Hicks, Detroit national advertising agency, has been elected president of Koppitz-Melchers, Inc., Detroit brewery.

Maurice H. Karker, Glencoe, Ill., chairman of the board and former president of Jewel Tea Co., has been appointed chairman of the War Department Price Adjustment Board.

Lawrence S. Martin has been elected secretary of the National Association of Frozen Food Packers, succeeding Edgar M. Burns, resigned. Mr. Martin has been in charge of the quick frozen foods division of OPA.

Lt. Col. W. A. McDonald, general manager of McDonald Dairy Co., Flint, Mich., and president of McDonald Ice Cream Co., Ann Arbor, Mich., has been appointed salvage officer to supervise the Quartermaster Corps conservation and reclamation projects in Michigan, Illinois and Wisconsin.

John H. Nair, formerly assistant director of the Syracuse research laboratory of Borden Co., and more recently engaged in

NATHAN CUMMINGS

Sprague, Warner & Co., Chicago, Ill., was recently purchased by C. D. Kenny Co., Baltimore, Md. Initial negotiations started July 4 following declaration by a government agency that the new Sprague, Warner & Co. plant was needed for wartime use. Nathan Cummings, president of C. D. Kenny, will be president of Sprague, Warner, but no change in policy or personnel is contemplated. Combined sales of the Kenny-Sprague, Warner combination is in excess of $30,000,000 per year, to more than 35,000 customer stores.

technical sales activities for the company's dry milk division, has joined Continental Foods, Inc., Hoboken, N. J., where he will undertake research and development in dehydrated foods.

George Gordon Paton, former economist for the New York Coffee and Sugar Exchange, has been named executive vice-president of Commodity Research Bureau, in New York.

William Whitney Pinney, president of the New York Coffee and Sugar Exchange, has resigned to assume active duty as Lieut. Senior Grade, U. S. Navy. Richard L. Lamborn, treasurer of the organization, has also resigned to enter the Navy, and Fredcrick R. Horne, a board member, has resigned to become associated with the Board of Economic Warfare, Sugar Section. Washington, D. C.

Forrest Rogers has been appointed vice-president of B. C. Sugar Refinery, Vancouver, B. C., succeeding R. Adamson, who has resigned from that position but will remain a director of the organization.

Douglas E. Scalley, vice-president and general manager of Utah-Idaho Sugar Co., Salt Lake City, has been elected president of the United States Sugar Beet Association, succeeding Frank A. Kemp.

H. H. Shockey, National Fruit Products Co., Winchester, Va., has joined the technical staff of Deerfield Packing Corp., Bridgeton, N. J.

Chester T. Vandenover has resigned as sales manager of International Milling Co., Minneapolis, to become vice-president of the Atkinson Milling Co. of that city.

Richard Wheatley, Louisville, Ky., has been elected president of the newly organized Mayonnaise and Salad Dressing Manufacturers' Association, Inc. The organization has already petitioned WPB and the Food Requirements Committee to declare mayonnaise and salad dressing an "essential food."

T. B. Young, Summerland, B. C., is establishing an apple drying plant at Summerland, installing five evaporators and other equipment.

DEATHS

Clarence A. Brody, 60, manager of the Constantine, Mich., Co-operative Creamery and president of Mid-West Producers Creameries, recently, in Constantine.

Carl F. Dahlberg, 63, president of South Coast Corp., producers of cane sugar, New Orleans, recently, en route to New York. He was a founder of Celotex Corp. and a member of the Cane and Beet Sugar Packaging Advisory Committee.

Kenneth E. Hatfield, 45, general manager of the Cudahy packing plant at Kansas City, Mo., and former manager of the Omaha, Neb., district for Cudahy, recently, in Rochester, Minn.

Dwight E. Hillyer, 64, comptroller of Libby, McNeill & Libby, Chicago, Aug. 4, in Chicago.

Louis B. Olin, 58, founder and chairman of the board of Goldenrod Ice Cream Co., Chicago, July 29, in Chicago.

Theodore F. Pappe, 57, chief of the Buffalo, N. Y., office of the Federal Food and Drug Administration since 1935, Aug. 4, in Buffalo.

Cliff N. Power, 67, past president of American Bakers Association, recently, in Oakland, Calif.

David Lewis Stull, 59, owner of Stull's Highland Ice Cream Co., Birmingham, Ala., Aug. 7, in Birmingham.

ASSOCIATED INDUSTRIES

Crocker-Wheeler Electric Co. recently held a ceremony at its Ampere, N. J., plant when five employees were presented with silver "Victory" pins for ideas submitted in a contest to accelerate war production of electric motors and generators.

Food Machinery Corp., Lakeland, Fla., has received a joint Army-Navy production award for outstanding achievement in the war effort.

Fritzsche Brothers, Inc., New York, has developed a War Gas Identification Kit, approved by OCD, to offer the country's war gas instructors complete equipment for demonstrations.

Monsanto Chemical Co., St. Louis, has been notified that its plants at Monsanto, Tenn., and Anniston, Ala., have been awarded the joint Army-Navy production pennants.

National Safety Council has named Ned H. Dearborn, dean of the division of general education, New York University, as executive vice-president and managing director of the Council, succeeding W. H. Cameron, who has retired.

Permutit Co., New York, has reported the death of Frank S. Dunham, one of the earliest members of the company's field engineering force.

Sherman Paper Products Corp., Newton Upper Falls, Mass., has developed a pan-conservation program to help bakers make their pans last longer and increase bakery production.

NATIONAL CAN CORP.'S NEW CHICAGO PLANT

National Can Corp. has recently completed construction of its newest manufacturing plant in Chicago. It is removed from traffic centers, but is strategically accessible to all the main highways and railroads which serve the Mid-West. The new plant is equipped with modern can-making machinery.

FOOD EQUIPMENT NEWS

Load Center Substation

STANDARDIZED load center unit substations are now being supplied by Allis-Chalmers Manufacturing Company, Milwaukee, Wis. in sizes ranging from 100 to 2,000 kva. The purpose of the load center unit is that it may be installed close to the power moving equipment, in industrial plants, thus saving long secondary runs of heavy copper conductors necessary when some other systems of power distributions are used.

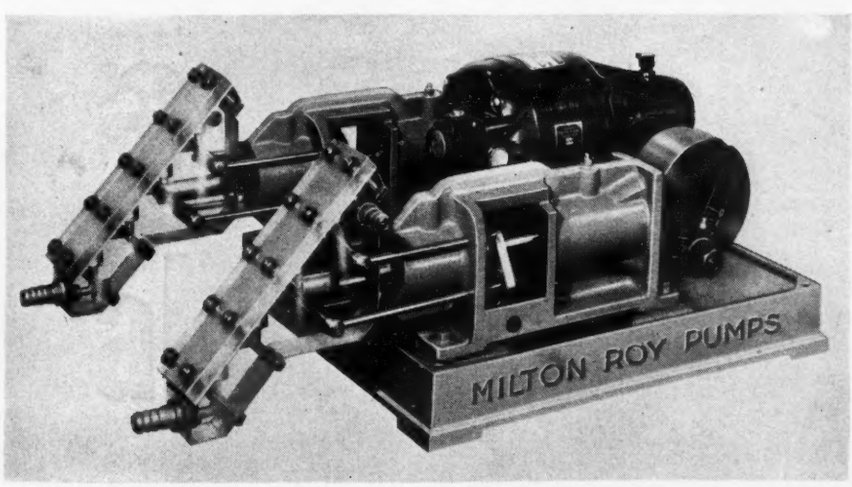
Construction of these units allows for a wide choice of incoming and outgoing line arrangements. Each substation consists of a metal-enclosed incoming line section, throat-connected transformer and a low voltage feeder section.

Advantages claimed for the substation are complete enclosure; uniformity of appearance; absence of exposed leads, buses and splices; and speed and ease of installation. The units are available for either indoor or outdoor installations.

Plastic Pumps

MILTON ROY PUMPS, 1300 East Mermaid Ave., Philadelphia, Pa., has brought out an improved model of its "Step-Valve" pump in which the "step-valve" inlet and discharge connections are made entirely from transparent plastic. The pump is of typical "step-valve" design, with double ball ground glass checks and adjustable stroke for accurate control of volumes from one quart per hour to maximum capacity. In the duplex model the pumps will handle up to 100 gal. per hour, while the simplex models handle up to 50 gal. per hour. The pumps operate under pressures as high as 150 lb. per sq. in.

The single-piece cover plates are readily removable without disturbing the pump connections. The transparency of the plastic material makes it possible to observe the pump while in action and detect discoloration or dirt particles in the liquid as it passes through.



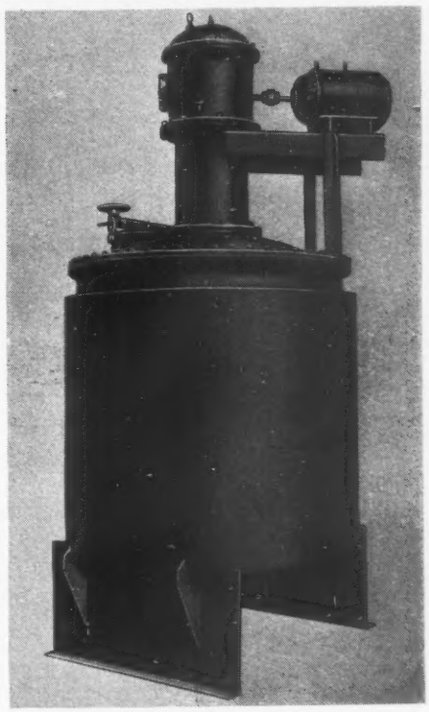
Duplex model of plastic "step-valve" pumps.

Mixer for Heavy Materials

L. O. KOVEN & BROS., INC., Jersey City, N. J., has developed a new mixer, incorporating in one mixing tank three means of agitation. The purpose of this is to produce completely homogeneous diffusion, kneading, blending, and absorption, in thick mixtures.

The body of this mixer is an all-welded tank with a dished bottom. An outside jacket is provided when desired for heating or cooling the product during the processing. The cover, which is attached to the mixer by bolting, is provided with a manhole that can be opened quickly by turning a hand-wheel which releases a lever holding the cover in place. An outlet valve is provided in the tank bottom of a type depending upon the mixture that is to be handled. The agitating mechanism consists of a vertical shaft driven from its upper end by a motor operating through a speed reducer. The agitator is of three-bladed ship propeller type and is mounted so that it can be adjusted to any desired position in the tank depth. In addition there is mounted at the bottom of the shaft a turbine type impeller. The tank itself is provided with four baffles projecting radially in four quadrants along the tank wall, but mounted several inches away from it.

In operation, rotation of the propeller causes the material to be sucked down toward the turbine, which then gives the material a combined circular and upward motion. As some of this material strikes the baffles, it is turned back with the result that it is given an extra kneading or mixing action. At the same time, some of the material flowing between the baffle and the tank wall is given a shearing action. In this way, the entire contents of the mixer goes through a continuous repetition of suction, dispersion, kneading and shearing actions, which are said to result in rapid disintegration and dispersion of the solid material throughout the mixture.

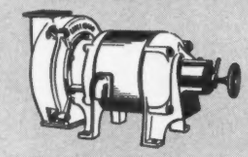


Mixer designed for handling heavy materials.

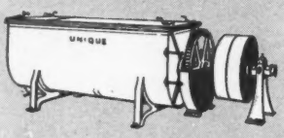
Blackout Paint

MAAS & WALDSTEIN CO., 438 Riverside Ave., Newark, N. J., has developed a luminous blackout paint, used to render objects visible in the dark. This paint owes its luminosity to a substance which re-radiates light, according to the maker, and contains no toxic materials. After a few minutes exposure to daylight or to ordinary electric lumination, the paint is said to glow for about 20 hours, and

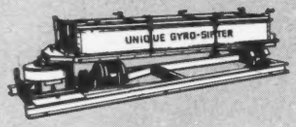
GRINDING



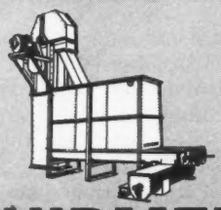
MIXING



SIFTING



HANDLING



EQUIPMENT

Tell our engineers your war production problem. Catalogs and counsel at your service!

ROBINSON

MANUFACTURING COMPANY

WORKS: MUNCY, PA.

30 CHURCH STREET, NEW YORK

to repeat this action after re-exposure.

Known as "Durad" luminous paint, this product must be used over a special primer and thinned with a special thinner. One thick coat, or better, several thin coats, produces a flat white finish suitable for indoor service. For a glossy finish, or for outdoor service, the paint is covered with a special clear topcoat.

pH Testing Set

R. E. Cargille, 117 Liberty Street, New York, is now making a pH test set consisting of Cargille Buffer Set No. 1 with Hydrion Wide Range pH Test Paper.

In using this set, solutions of known pH are made by dissolving tablets. Solutions are applied to the test paper to bring out on the paper the color of any half unit from pH 3 to pH 11. Colors are used for reference in judging the pH of the sample to be tested and readings can be made to ½ pH unit. This set is particularly designed for control tests carried out in the plant by unskilled workers. Another use is for quick preliminary tests in laboratories where more elaborate pH testing apparatus is available.

Stainless-Clad Bottle Conveyor

Jessop Steel Co., Washington, Pa., in cooperation with Cherry-Burrell Corp., Little Falls, N. Y., have developed a conveyor chain for moving milk bottles from washers to fillers, to hooders and so on, in which the links are made of stainless-clad steel. The purpose of this development is to substitute the more abundant stainless-clad metal in place of the sheet brass formerly used in such conveyors. This type of metal, the manufacturers state, is a relatively thin layer of stainless steel clad on ordinary steel, which requires less alloy and yet gives the desired protection from corrosion.

Lubricator

Oil Rite Corp., 3466 South 13th Street, Milwaukee, Wis., has brought out the "Oil-Rite Constant Level Lubricator." This lubricator holds a visible reserve supply of oil, and is designed to release automatically this supply in order to maintain a predetermined level of lubricant in the lubricator. The purpose of this is to insure adequate lubrication at all times, to prevent oil waste and to avoid spoilage of material caused

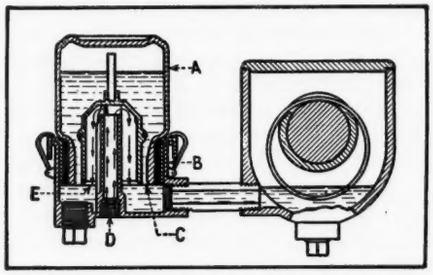
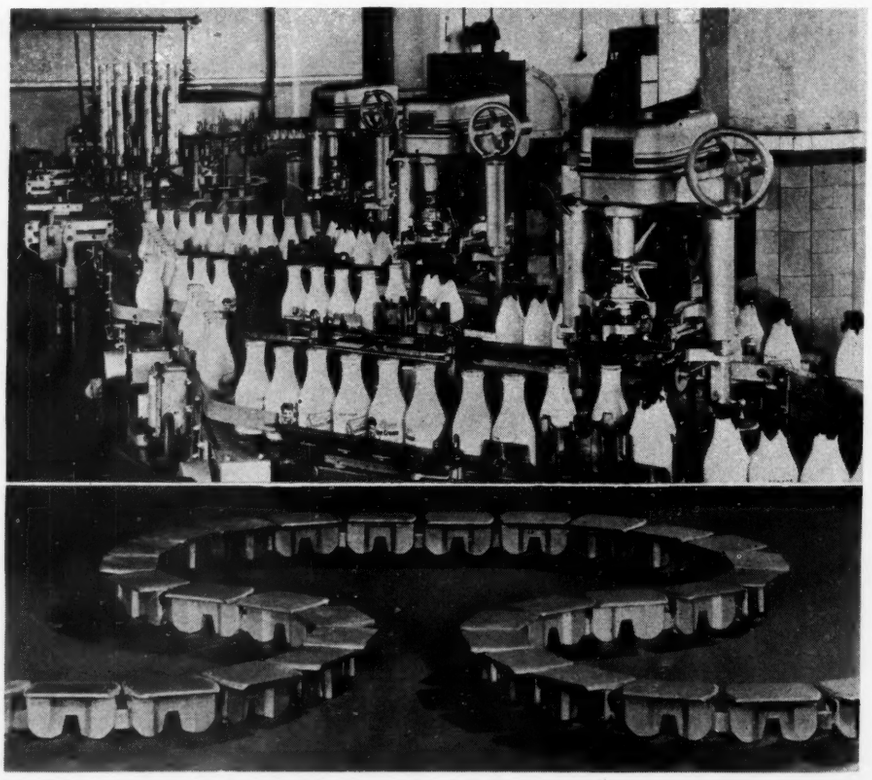


Diagram of constant level lubricator.



Bottle conveyor made of stainless-clad steel to replace the brass plate formerly used.

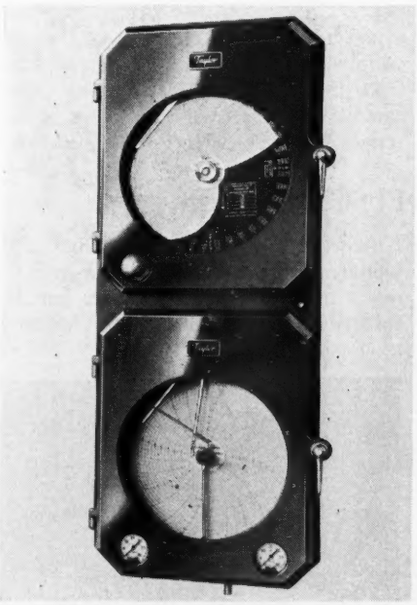
by oil throw. Among the types of equipment for which this lubricator is recommended by the manufacturer are: motors, pumps, air conditioning equipment, ventilating fans, gear boxes and machinery bearings that must be provided with ample lubrication.

Referring to the accompanying sketch, when the reservoir *A* is filled and inverted into position on the base *B*, the lower edge *E* of the inverted metal bell determines the oil level which a lubricator will maintain. When the level falls below this point, air from the vent *D* escapes from the side of the bell—as at *C*—up to the top of the lubricator, permitting oil to flow down until the level to be maintained again seals across the base of the bell.

The new lubricator is available in four different sizes, with capacities of 2, 4, 8 and 16 oz.

Schedule Controller

For the control of the operation of such equipment as compartment type dehydraters, certain designs of retorts, and other equipment operated on a time schedule, Taylor Instrument Companies, Rochester, N. Y., recently brought out the "Fulscope" time schedule controller. This is designed for maintaining a set temperature, pressure, flow or liquid level according to a predetermined time schedule, enabling a processing plant operator automatically and precisely to repeat any process as many times as may be desired.



Time schedule controller suitable for use in controlling compartment type dehydraters, retorting operations and other food processing operations.

In construction, a cam and chart are individually mounted and conveniently

DEHYDRATED FOOD Products *MUST* Be Prepared Under Modern *SANITARY* Conditions!

Whatever vegetables, fruits, meat or other dehydrated food products you are now packing for Army, Navy, lend-lease or civilian use, make doubly sure of maintaining required high sanitary standards under which they must be prepared. But do this faster, easier, at lower cost, by using specialized, safe

OAKITE CLEANING Materials . . . Methods

Note how THOROUGHLY and SPEEDILY clean-up work is performed . . . how much time and effort Oakite emulsifying and wetting-out action saves you by eliminating or reducing scouring and scrubbing! Note, too, that Oakite materials rinse away freely, leaving equipment surfaces in sanitary, film-free condition. And the exceedingly small amounts of material used make your cleaning dollar go further!

Do These 7 Jobs FASTER . . . EASIER!

Here, for example, are SEVEN different jobs which are now being successfully speeded-up, handled more easily and economically with Oakite materials and methods:

1. Cleaning steam-jacketed cookers
2. Removing fruit stains from hoppers, pulpers, etc.
3. Washing stainless steel, galvanized, wire-mesh trays
4. Removing lime-scale deposits from blanchers
5. Cleaning sorting and inspection conveyor belts
6. Washing dehydrating room floors
7. Cleaning vegetable peelers

The competent, personal service of our Nation-Wide Field Staff, the assistance of our Technical Laboratories, our 33 years' experience . . . ALL are freely available to help you find the RIGHT ANSWER to these and other cleaning or related problems. Write today!

OAKITE PRODUCTS INC., 26G THAMES STREET, NEW YORK

Representatives in All Principal Cities of the United States and Canada

Consult ROSSOTTI —on Packaging *

* Yes, For Dehydrated Foods too!

Why not talk over your requirements for labels, wraps, or folding cartons with an organization that has manufactured fine packaging since 1898.

Our staff includes specialists in all phases of packaging: design, construction, and application. These specialists and the facilities of a modern plant are at your service.

An inquiry directed to our North Bergen plant or your nearest Rossotti representative will be given immediate attention. No obligation, of course!

Rossotti Lithographing Co., Inc.,
North Bergen, N. J.

Rossotti
Specialists in Food Packaging since 1898
Branch Plant - San Francisco
BOSTON PHILADELPHIA CHICAGO PITTSBURGH LOS ANGELES

located for individual comparisons. Features of the controller include: friction drive cam assembly which permits rotation of the cam without loosening any locking means; improved means of resetting one cam without disturbing the other in instruments having two complete control mechanisms; each cam is capable of operating from one to four air valves, microswitches, or both for the actuation of any internal mechanisms such as a valve, bell or light, and do this automatically in any desired relation of one to the other; and automatic return of the cam to the starting position.

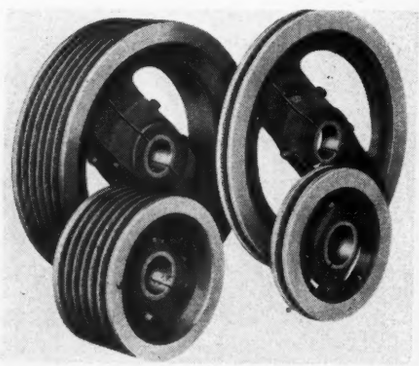
An optional feature of this new schedule controller is the "Interrupter Timer," which allows flexibility to both the rise and the holding periods of the process under control. This timing feature allows the use of a very fast cam clock for a rapid rising period, but reduces the speed of the clock to increase the length of the holding period. The rising period, the holding period or both, may be increased as much as 6½ times the normal period by means of this interrupter timer.

The schedule controller is available in all control forms, including automatic reset and "Pre-Act." By the addition of pre-calibrated assemblies it can be easily converted to any process requirement that may arise in the future.

Wooden Sheaves

Dodge Manufacturing Corporation, Mishawaka, Ind., has brought out the "Victory" wooden sheave for use in V-belt drives as an alternate for metal sheaves. The manufacturer states the efficiency of this sheave is equal in every way to that of metal sheaves except where a flywheel effect is essential. The sheave is constructed of laminated wood and the segments making up the laminations are of straight grain kiln dried hard maple. Wooden bushings are provided and provision is made for firm locking of the sheaves to the shaft.

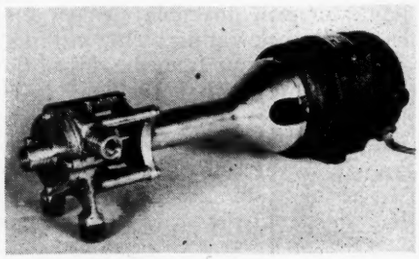
These new sheaves are offered in composite groove-types for A and B section belts in the full range of sizes and for B belts in sizes from 5.4 pitch diameter to 38 pitch diameter, up to 10 grooves; and for C belts from 5.4 pitch diameter to 44 pitch diameter, up to 12 grooves.



Wooden sheaves for V-belt drive for use as an alternate for metal sheaves.

Small Hot Liquid Pump

Eastern Engineering Co., 45 Fox St., New Haven, Conn., has introduced a small sized pump for hot liquids. Known as the Model EH hot liquid pump, this device features compact size and construction, and ability to handle hot liquids up to 500 deg. F. It is particularly designed for use in pilot plants, laboratories and experimental applications. The capacity is up to 7½ gal. per min. at maximum pressure of 21 lb. per sq. in. It is of centrifugal type and is powered by a 1/20 hp. universal motor coupled to the pump through a 5 in. heat radiating tube. This new pump can be manufactured in a range of materials suitable for various applications.

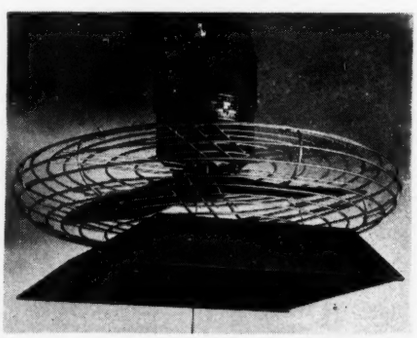


Small pump for hot liquids

Fly-Chaser Fan

Reynolds Electric Co., 2650 W. Congress St., Chicago, Ill., has brought out a new design of fly-chaser fan. Installed over a doorway, the device is said to prevent flies from entering a building, even though the door is frequently opened. In addition to keeping out flies, it is stated that the fan will keep out dust and heat from the street.

Installed at a height of 12 ft., the fan will protect a space 24 ft. long by

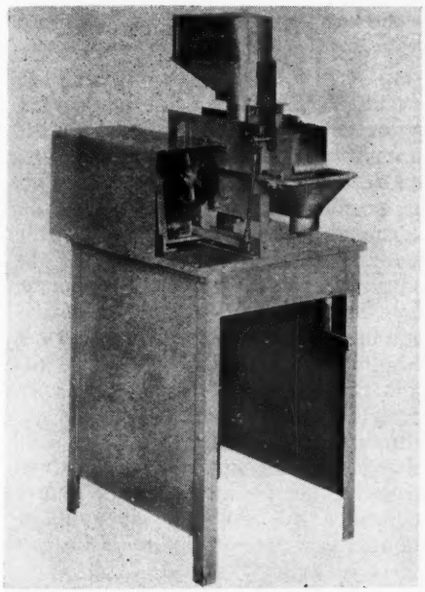


Fan designed for preventing flies from entering plant doorways.

30 ft. wide. The fan has a diameter of 20 in. and is equipped with a two-blade plastic propeller. Where desired for use in a doorway wider than 6 ft., it is equipped with a "Deflek Aire" unit, as shown in the illustration.

Packaging Machine for Dry Materials

TRIANGLE PACKAGE MACHINERY CO., 900 N. Spalding Ave., Chicago, has announced a packaging machine for measuring granules and powders and other finely divided dry materials. In this machine, the material is fed from a suitable hopper, through an adjustable gate, onto an endless belt. The width of the belt and the belt length between the gate and the end point at which



Packaging machine for filling dry powdered and granulated materials.

the material is discharged over the forward pulley, are predetermined. By adjusting the gate to control the depth of the material on the belt, a predetermined volume is deposited.

As the belt moves forward intermittently, a series of uniform deposits of the material are made upon the belt. During the time in which the belt is stopped, the package is filled and the operator removes it and inserts a new unfilled package ready for the next load of material. The belt movement is controlled by a ratchet which engages a gear. The ratchet is operated from an eccentric so that it engages with and moves the belt drive wheel at regularly spaced intervals. When the belt stops, a small plate, driven from a shaft operated on the ratchet eccentric, is lowered against the belt at a point above the forward pulley thus cutting off the flow of material and preventing

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1 Temperature Control Adjustment easily made from front of Controller. Control Setting may be locked inside case if desired.

2 Removing plug-in relay. Relay interchangeability permits conversion to other types of control circuits or back.

3 Plug-in Control Chassis is easily removed for inspection, replacement or interchanging for other types of control circuits. Plug sockets may be seen above relay.

4 Interchangeable Measuring Sections permit choice of scale range or type of temperature measuring system (Potentiometer, Millivoltmeter, or Resistance Thermometer).

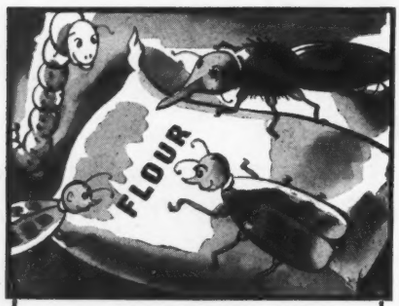
Instantaneous control action with the famous "Electronic Principle" control system and extreme accuracy of temperature measurement, plus interchangeability of all component parts, interchangeability of scale ranges, ready accessibility of all parts for individual checking and many other features.

Wheelco UNIVERSAL Controllers include Capacitrols, Potentio-trols, Limitrols and Resistance Therm-otrols.

For full details, write for free Bulletin Z6000

Wheelco Instruments Co.
823 W. HARRISON STREET • • • CHICAGO, ILLINOIS

CONTROL THOSE PESTS!



FLOUR moths, weevils, worms and other pests are among the costly nuisances and profit-stealers in food processing. Unless controlled they can be the cause for complaints, returned goods and loss of consumer good will.

Control pests by thorough fumigation with properly applied HCN gas. Call on your local Pest Control Operator. Talk over your pest problem with him and let him show you his plans for effective control. You will find that a well planned fumigation program carried out by expert and experienced Pest Control Operators may save you future expense and worry that will make it worth many times its original cost.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

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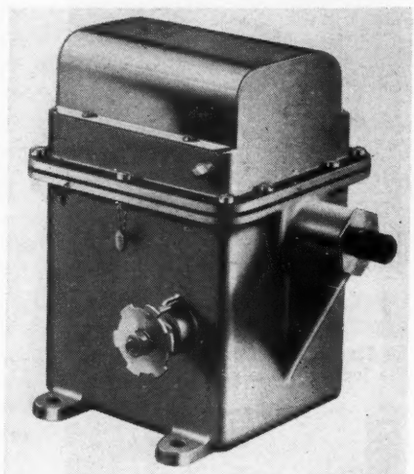
any dribble from the next load on the belt.

It is stated that the range of this machine is for filling packages from 1 oz. to as high as 1½ lb. in content. Speed of production is approximately 25 filled packages per minute.

Valve Control

FOR operating butterfly valves, multiple ratio fuel valves, and for regulating dampers in air conditioning and drying systems, Barber-Colman Co., Rockford, Ill., has brought out "Microtol." The device consists of a high torque proportioning control motor with built-in limit switches and potential dividing rheostats.

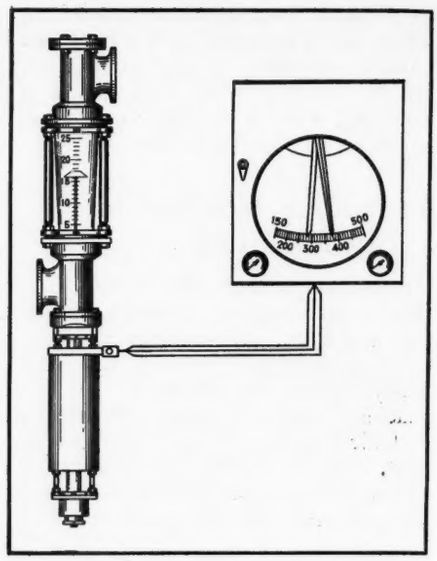


Motor device for operating butterfly valves, multiple ratio fuel valves and for regulating dampers in the air conditioning and drying systems.

Flow Controllers

FISCHER & PORTER CO., Hatboro, Pa., has brought out a recording-controlling Rotameter, the "Rotamatic," with fully automatic control of flow rates. The purpost of this device is for measuring and controlling the flow of liquids and making a permanent chart record. In this design, the Rotameter float position is transmitted to the recorder pen arm through the use of a self balancing induction bridge. When the recorder pen arm is not at the same position as the control index arm, a flapper changes the air pressure within a bellows type control system. The changed air pressure opens or closes a diaphragm motor control valve in the flow line, in order to bring the rate of flow back to the desired control point and to keep it at that point.

This meter is made with indicating-controlling, record-controlling, or recording-integrating-controlling features to suit various requirements. The controller



"Rota-Matic" controller for recording and controlling the flow rate of viscous liquids.

can also be used to control the quantity of one flow in constant ratio to the amount of another flow. In addition, time-cycle variations of control points are possible with this controller.

Among the advantages claimed by the manufacturer are the following: All the advantages of the standard Rotameter flow rate instrument, plus completely automatic flow control; control points adjustable to any point over the entire flow range of the instrument; 150 percent throttling automatic reset for synchronizing to process lags and load changes; flow controlled directly from remote panel-mounted instruments; permanent record of flow provided; indication of flow rate at Rotameter in case of power failure.

Absolute Pressure Gage

BROWN INSTRUMENT COMPANY, Wayne & Roberts Ave., Philadelphia, Pa., has brought out an absolute pressure gage for use by food, chemical and other industries to measure accurately and to control pressures that are low enough to be affected by variations in barometric pressures. Because this gage, of opposing bellows design, is made to operate at extremely low pressures, the manufacturer states that great care has been taken in the selection of the material and method of construction. The models available are a single record recorder and a single record air-operated controller. These models are available with ranges of 100, 200, 300, 400 and 500 mm. of mercury, absolute pressure, and 15 lb. per sq. in. absolute pressure.

Air Raid Alarm

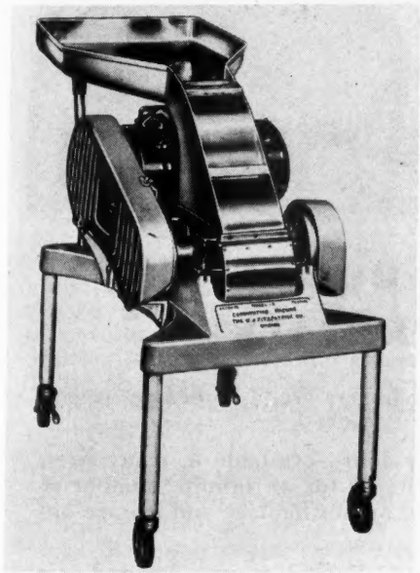
PHOTOSWITCH, INC., 21 Chestnut St., Cambridge, Mass., has developed a pho-

to-electric control for the purpose of providing a warning signal to apprise factory workers in the event of an air raid. In many cases, it is said that it is impossible to hear outside air raid warnings inside a factory because of the noise of the machinery in the factory.

The new control is placed in a convenient location so that it views a centrally controlled street lamp. Through the photoswitch are connected alarm systems operating inside the factory. When the street light is turned out, it activates the switch and the alarms are sounded. The control is designed to operate independently of any momentary flickering of the street lamps, also independently of surrounding lights.

Grinding Machine

W. J. FITZPATRICK Co., 111 N. Canal St., Chicago, is making the Model D comminuting machine which performs grinding, mixing, pulverizing and granulating operations on wet or dry materials. This is a portable machine mounted on casters and provided with a device for locking it in position. The machine has two forward speeds, 5,000 r.p.m. with double belt, and 1,000 r.p.m.



Comminuting machine for grinding, mixing, pulverizing and granulating operations in the food industries.

with single belt. It is designed with all parts coming in contact with the products of suitable metal which can be readily cleaned with live steam or water. This grinding machine is available with screens of standard sizes of perforations of 1/32 to 1½ in., and with wire-mesh type screens of 6 to 100 meshes per inch. It is operated by a 3 to 5 hp. motor, depending on service, and is available in various alloys to suit the product being handled.

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LET US HELP YOU PROCESS
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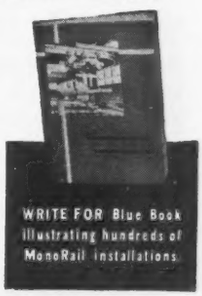
★ From cooking and cooling process to piling of cartoned goods, there is an unusual amount of handling and rehandling. Much, if not all, manual handling and rehandling can be eliminated with American MonoRail Overhead Handling Equipment. Hundreds of plants are now producing more faster with American MonoRail equipment on the job. Let an American MonoRail Engineer show you the possibilities that this equipment offers in eliminating production delays, cost reducing delays and the surprisingly low cost of installation and operation. Available for manual, automatic or electric operation. There is no delay or shutdown during installation.

See the American MonoRail Engineer at once—he will show you how you can help to help win the war.



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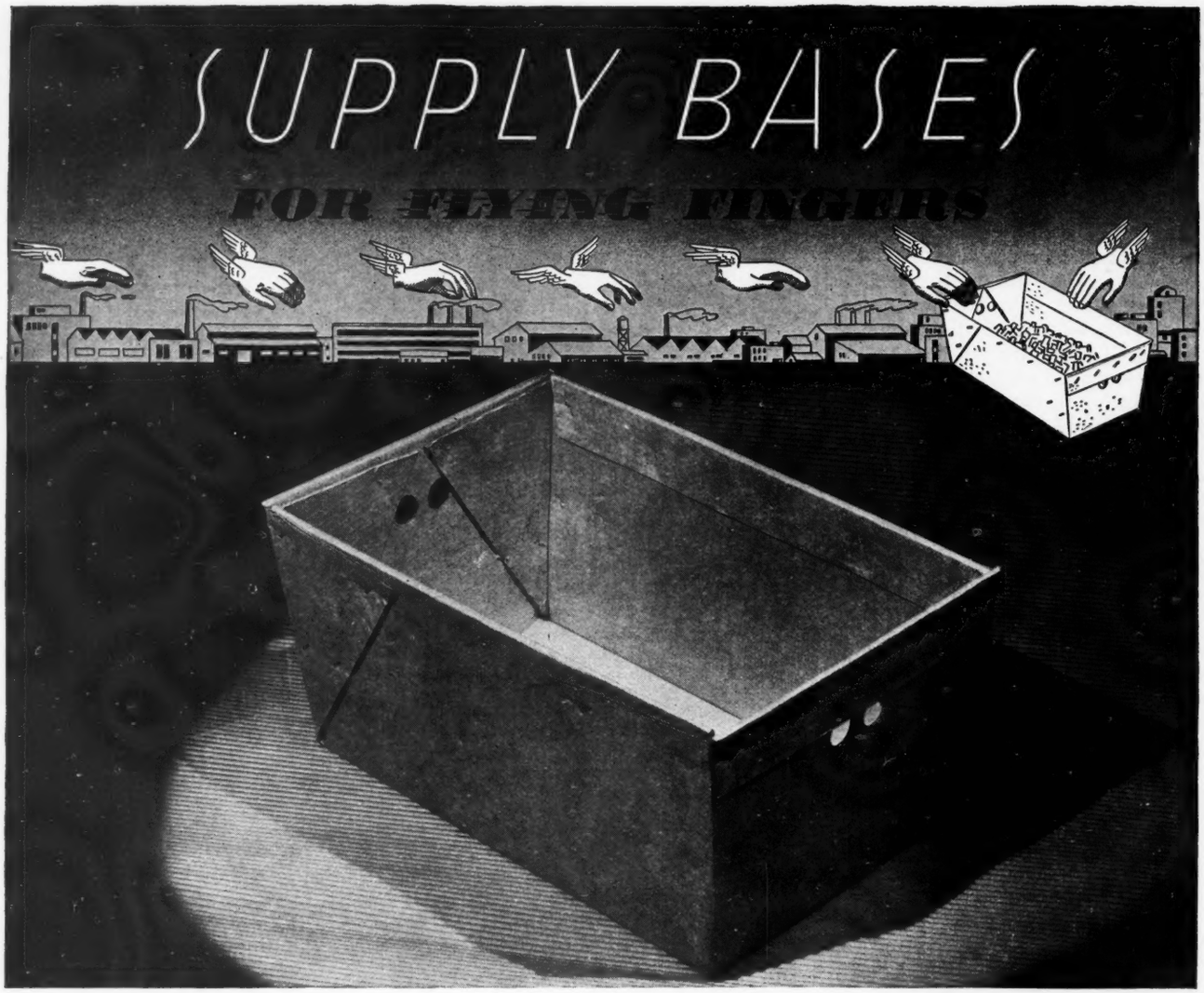

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Economical — constructed of inexpensive available materials, H & D corrugated tote boxes save you money in original costs.

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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Air Compressors—Single cylinder, single stage air compressors, Type HB and HS, with 9, 11 and 13 in. stroke, in capacities up to 1987 cu.ft. per minute, are described in Specification L-640-S2, issued by Worthington Pump & Machinery Corp., Harrison, N. J.

Air-Conditioning—The capillary cell and its application in air-conditioning equipment as a direct heat transfer surface between water and air is the subject of a 24-page illustrated booklet issued by Air & Refrigeration Corp., 485 Fifth Ave., New York.

Condensate Return—An automatic electric condensate return and feeding system for use in returning condensate from processing equipment to boilers operating at any pressure up to 250 lb., is briefly described in a leaflet published by W. M. Acker Organization, Inc., 3167 Fulton Road, Cleveland, Ohio.

Conveyors—Two new sizes of the "Bulk-Flo" elevator, together with general information concerning this type of conveyor, the materials it handles, and its specifications, are included in a 32-page illustrated booklet, No. 2057, published by Link-Belt Co., 307 N. Michigan Ave., Chicago.

Data Sheet—A "Confidential Mixing Operation Data Sheet" providing a simplified and accurate breakdown of any mixing operation, designed to facilitate accurate selection of proper-sized mixers, has been issued by Mixing Equipment Co., Inc., Rochester, N. Y.

Glass-Lined Tanks—Mixing and storage tanks of glass-lined construction, in capacities from 5 to 100 gal., are described in Bulletin 815, published by the Pfaudler Co., 89 East Ave., Rochester, N. Y.

Quick Freezer—Quick freezing plates for use in the freezing of meat, fish, poultry, fruits and vegetables, are illustrated and briefly described in a leaflet issued by Dole Refrigerating Co., 5910 N. Pulaski Road, Chicago.

Processing Equipment—Such equipment as cookers, dryers, evaporators, heat exchangers, kettles, mixers and tanks are pictured and briefly described in an 8-page bulletin published by Patterson-Kelley Co., Inc., East Stroudsburg, Pa.

Refrigerating Equipment—"Eclipse" refrigerating machines and accessories using Freon-12 as a refrigerant, in capacities from 15 tons up, are illustrated and described in Bulletin No. 100-C issued by Frick Co., Waynesboro, Pa.

Stainless Steel Equipment—The fabrication of "Enduro" stainless steel, including such methods as shearing, blanking, drawing, spinning, machining, forging, and so on, is discussed in a 40-page illustrated booklet published by Republic Steel Corp., Cleveland, Ohio.

Vacuum Method—High vacuum processes used in the processing of foods and in various other applications, together with information on vacuum pumps and their selection, are contained in a new 30-page illustrated catalog published by F. J. Stokes Machine Co., Tabor Road, Philadelphia, Pa.

PLANT SUPPLIES

Blowers—Specification data, application information and installation views are contained in a 20-page illustrated catalog on rotary positive blowers published as Bulletin No. 22-23-B-11 by Roots-Connersville Blower Corp., Connersville, Ind.

Circuit Breakers—Catalog No. 3130, describing small oil circuit breakers designed for use on a.c. circuits in industrial plants, in capacities from 600 to 3000 amp. at voltages up to 15,000 volts, has been published by Roller-Smith Co., Bethlehem, Pa.

Diaphragm Pump—Type O-D-S diaphragm pumps for handling hot or cold liquids of acid, neutral or alkaline nature, in which the solutions, slurries or other liquids do not come in contact with metal parts, thus making the pump resistant to corrosion, are described in Bulletin No. 307-R, of Oliver United Filters, Inc., 33 West 42nd St., New York.

Electrical Supply—Unit substations for the economical supply of power and lighting service to industrial plants are discussed with specifications in 28-page illustrated bulletin GEA-2592 issued by General Electric Co., Schenectady, N. Y.

Gas Engines—Vertical four cycle totally inclosed gas engines for operation on producer gas and similar fuels including natural, manufactured and refinery gases, type BDG in 175 and 210 hp. sizes, designed for use as stationary prime movers, are discussed in illustrated Bulletin F-550-B20 published by Worthington Pump & Machinery Corp., Harrison, N. J.

Lubricating System—Centralized lubricating systems, designed for lubricating all connected bearings through a single pipe, are described in a four-page illustrated folder issued by Trabon Engineering Corp., 1814 East 40th St., Cleveland, Ohio.

Pipe—A 48-page illustrated catalog giving the history, properties and applications of "Toncan" iron-pipe, a pipe made of corrosion-resisting alloy, has been published by Republic Steel Corp., Cleveland, Ohio.

Power Supply—The "Load-Center" method of power distribution, utilizing the unit substation, for supplying electricity in industrial plants, is discussed in 16-page bulletin No. GEA-3758, published by General Electric Co., Schenectady, N. Y.

Pump Data Sheet—A series of data sheets to aid in the selection, installation, operation and maintenance of all types of industrial pumps, together with an 18-page booklet entitled "Pump Fundamentals," has been issued in a file folder by Department 33, Goulds Pumps, Inc., Seneca Falls, N. Y.

Rotary Pumps—"Facts About Rotary Pumps" is the title of a 6-page illustrated folder, Bulletin 301, which gives a detailed explanation of the "swinging vane" type of rotary pump, as made by Blackmer Pump Co., Grand Rapids, Mich.

Wire Screen and Cloth—A handbook of useful information for the buyer of wire cloth and screens, including specifications and information on application, selection and ultimate use, has been issued as a 116-page illustrated catalog by Newark Wire Cloth Co., 351 Verona Ave., Newark, N. J.

PACKAGING

Packaging War Foods—Protection for shipment of war foods, by means of the steel strapping of shipping cases and other reinforcing methods, is discussed in Acme Process News No. 7, published by Acme Steel Co., 2840 Archer Ave., Chicago.

Label and Other Printing—"The Value and Use of Full Color" is the title of a 28-page book, discussing how the user of packaging material, booklets and other such matter can enjoy the full advantages of color printing and still conserve critical pigments, issued by Stecher-Traung Lithograph Corp., Rochester, N. Y.

Packaging—"How to Stack and Load Corrugated Shipping Boxes" is the title of a booklet on how to reduce damage to products, increase available storage space, and facilitate handling by efficient stacking and loading practices, published by the Hinde & Dauch Paper Co., Sandusky, Ohio.

Wrapping Machine—The adaptation of its Model C wrapping machine to the use of

MOVE MATERIAL ★ SWIFTLY— SMOOTHLY—

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MAINTAIN your "Victory" production pace . . . install Standard Conveyors to assure a smooth, uninterrupted flow of materials and parts through "mechanized handling" all along the production line—to avoid congestion in working areas—to release men for production work—to make better use of existing plant space.

Write for Bulletin FI-9, "Conveyors by Standard"—shows all types of Standard power and gravity conveyors that will aid you to maintain and increase the schedule of production in your plant.

STANDARD CONVEYOR COMPANY
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substitute waxpaper wrappers in place of foil, in the wrapping of such products as chocolate bars, is described in a recent folder of Package Machinery Co., Springfield, Mass.

Replacement Packaging—Suggestions and information in connection with the use of printed cellophane in the replacement of other packaging materials for foods are contained in a recently issued illustrated publication of Milprint, Inc., Milwaukee, Wis.

CONTROL EQUIPMENT

Control Equipment—In Bulletin 6,000, a 16-page illustrated booklet, measuring and control instruments operating on the electronic principle, also remote controllers, combustion safeguard equipment and other instruments, are described by Wheelco Instrument Co., Harrison and Peoria Sts., Chicago.

Density Recorder—Instruments for the automatic measurement and recording of the density of food liquids during processing, to take the place of periodic readings by hydrometer, are described and illustrated in Bulletin A-264, of Foxboro Co., Foxboro, Mass.

Electrical Instruments—Ammeters, voltmeters and other electrical instruments of switchboard type are described with list prices in Catalog No. 4220, a 12-page illustrated publication of Roller-Smith Co., Bethlehem, Pa.

Recording Thermometers—Fully compensated liquid-filled recording thermometers for temperatures between −125 and +400 deg. F., are described in Bulletin No. T-302, issued by Bristol Co., Waterbury, Conn.

MISCELLANEOUS

Bakery Sanitation and Maintenance—To aid bakery plant operators in making existing equipment last longer, a 5-page digest reviewing 21 successful methods for handling commonly recurring maintenance and sanitation jobs has been issued by Oakite Products, Inc., 26 Thames St., New York.

Corrosion Protection—The use of "Vulcalock" rubber lining for the protection of equipment from corrosion and abrasion, in the handling of various ingredients and materials, is discussed in Catalog Section 9000 by B. F. Goodrich Co., Akron, Ohio.

Maintenance Guide—"101 Suggested Good Operating Practices" is the title of a booklet for maintenance men who use packings, insulation, refractory cements and similar products, issued as Form PP-9A, by Johns-Manville, 22 E. 40th St., New York.

Wood Construction—"Stepping Up War Production with Redwood" is the title of an 8-page illustrated bulletin describing many applications of redwood timber and lumber in construction operations, published by California Redwood Association, 405 Montgomery St., San Francisco, Calif.

Sets Safety Record

(*Continued from page 66*)

an accident of any kind during the past 24 hours. But, just as soon as even a minor accident occurs, the green light is switched off and the red light flashes on. The red light then burns for 24 hours so that men of all shifts may see. A description of the accident and its cause is chalked-up on the lower section of the board. There are two framed sections which hold the standard National Safety Council poster or any special message or letter to employees. Posters are changed semi-weekly.

We continually fight the "red lights" at Reserve Refinery. It's not a cinch to keep them out. We consider every hazard serious. The employee who picks up a pencil prevents the painter, with that ladder under one arm and paint bucket in opposite hand, from falling. Result—no broken arm, no spilled paint, no lead burns of the eyes, no lost time.

Demethylated Pectin

(*Continued from page 53*)

lies.[8] This same report notes that through demethylation of pectin and the introduction of calcium salts, jellies of lowered sugar solids can be manufactured. The influence of methoxyl content upon pectin jellying values in gels containing 40, 50, and 65 percent soluble solids is shown in the present article.

For purposes of comparison the concentration of pectin required to form jellies of equal strength according to a jelly tester (50 cm. of water pressure or 35 gm. per cm. of plunger area) is calculated in each case to the basis of 100-grade pectin for 65 percent sugar jellies. Jellies were made by the hot method, that is, acid, calcium salt and sugar were mixed together, then the pectin solution was added and the mixture boiled to a predetermined weight. With the exception of Sample No. 2, Table I, all pectins were produced from apple pomace.

While the advantages of using a partially demethylated pectin do not appear to be appreciable in the case of 50 percent sugar jellies, they are very apparent in the case of 40 percent gels, as may be seen from the table and figure. At this latter concentration of sugar it would be uneconomical to make jellies from ordinary high-methoxyl commercial pectins, because of the considerable amounts of pectin required unless very high acidities are used. At a pH of 2.7, approximately twice as much pectin with a methoxyl content above 7 percent is required as that shown in the table. The Preserver's Handbook of the California Fruit Growers Exchange,† in Table 5, page 52 bears out this statement and shows the approximate amounts of pectin required to produce a jelly of standard firmness. The values given for 40 percent and 50 percent soluble solids, when calculated on the same basis as the values shown in the present article, are 3 percent and 1.08 percent pectin, respectively. Low pH values, around 2, showed a very considerable reduction in the required amounts of high-methoxyl pectins. The present data illustrate how the pectin requirements for both 40 and 50 percent sugar gels decrease rapidly with a decrease in methoxyl content below 7 percent.

It appears unnecessary to discuss the data or the figure at any length at this time; however, three observations need emphasis:

First, low-methoxyl pectins with the highest optimum calcium tolerance appear to be best suited for producing jellies with lower sugar solids. These pectins appear to be the ones most compatible with the effects of various fruit constituents. Optimum calcium concentrations increase with decrease in sugar concentration.

Second, while probably the high acid condition, shown by the table to be required for gelation of the high-methoxyl pectins, will be beneficial for the preservation of low-sugar jellied products, it is possible to make jellies at higher pH values with the low-methoxyl pectins.

Third, the setting time for jellies with lowered sugar solids increases with decrease in sugar content without definite regard to methoxyl content.

Summary

While partial demethylation of pectin to a methoxyl content of 7 to 8 percent, if properly carried out, improves the grade of pectin[8] and allows the pectin manufacturer to increase his output of a graded product, further demethylation may prove advantageous to the jelly manufacturer if, due to war conditions, it is required that jelly be made with 40 or 50 percent soluble solids instead of the usual 65 percent. Under these circumstances, if pectin is demethylated to a methoxyl content of 4 to 5.5 percent, without an appreciable loss of grade, the values of demethylation go to the pectin-consuming jelly manufacturer. While greatly increased amounts of high-methoxyl pectins are required to make a 40 percent soluble solids jelly, no increase or only slight increases in concentration of low-methoxyl pectins will be required. If high-methoxyl pectins must be used, low pH values will aid in the conservation of pectin.

Low-sugar jelly mixtures with low-methoxyl pectin are especially adaptable to continuous jelly manufacture.

References

1. T. D. Nunheimer and F. W. Fabian, Influence of Organic Acids, Sugars, and Sodium Chloride Upon Strains of Food Poisoning Staphylococci, *American Journal of Public Health*, vol. 30, 1040–49, 1940.
2. F. J. Erickson and F. W. Fabian, Preserving and Germicidal Action of Various Sugars and Organic Acids on Yeasts and Bacteria, *Food Research*, vol. 7, 68–79, 1942.
3. G. L. Baker and M. W. Goodwin, Fruit Jellies—XI, The Role of Pectin—7, Demethylation of Pectin and Its Effect Upon Jellying Properties, Delaware Agricultural Experiment Station Bulletin No. 234, Technical Paper No. 28, 1941.

Fruit Purées

(*Continued from page 51*)

will comminute even the skins. The pulp should then be mixed with the sirup and the cherry juice. From then on the procedure is the same as that described for berry purées. The product has a brilliant red color and a pronounced flavor and is highly recommended for use in ice cream of the variegated type.

Maraschino cherries in sirup (pulped)	35	lb.
Hot pressed Montmorency cherry juice	65	lb.
Granulated sugar	40	lb.
Enzyme-converted corn sirup	60	lb.
Pectin (100 grade)	2.5	lb.
Citric acid	8	oz.
Water	20	lb.

Orange Marmalade Purée

An orange marmalade should be prepared by cooking the following ingredients for about 15 minutes.

Orange juice	5	qt.
Lemon juice	1	qt.
Finely sliced and chopped cooked orange peel	2	lb.
Granulated sugar	7	lb.
Enzyme-converted corn sirup	8	lb.
Pectin	5	oz.
Water	2	lb.

The pectin is dissolved in corn sirup and water according to the procedure described under berry purées. The finely sliced and chopped cooked orange peel is heated to boiling in the mixture of juices. Then the pectin solution is stirred in. Next the granulated sugar is added and finally the remainder of the corn sirup. The whole is boiled for about 15 minutes but the total solids content should not be permitted to rise above about 55 percent. The product may be used in making either a variegated ice cream or sherbet.

† Published by the California Fruit Growers' Exchange, Ontario, Calif. (1941 edition).

BOOKS

Waste Disposal

INDUSTRIAL WASTE TREATMENT PRACTICE. By E. F. Eldridge. Published by McGraw-Hill Book Co., 330 W. 42d St., New York, N. Y., 1942. 401 pages; 6¼x9¼ in.; cloth. Price, $5.

Executives and technologists in the food industries which have waste disposal problems will find much useful information in this book. But authorities on disposal problems in any given industry may find the treatment of their particular problems somewhat briefer than they would like. The author squanders little space weighing the advantages of one system against another, but quickly draws his conclusion as to which is the best for the particular type of waste concerned. Then he describes concisely the operation of that treating method and gives pertinent data regarding the composition of the waste and the treating doseages.

After three general chapters discussing stream pollution; characterstics of industrial wastes; standard treatment methods, structures and equipment, the author devotes 12 chapters to as many kinds of industrial waste. The book concludes with discussions of the treatment of combined industrial waste and domestic sewage and methods of analysis for industrial wastes. Among the specialized chapters concerning the food industries are: Wastes from the Sugar Beet Industry, Milk-products-factory Wastes, Canning-factory Wastes, Meat Packing and Slaughter-house Wastes and Wastes from Fermentation Industries.

Facts About War Gases

WAR GASES, THEIR IDENTIFICATION AND DECONTAMINATION. By Morris B. Jacobs. Published by the Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y., 1942. 180 pages; 6¼x9¼ in.; cloth. Price, $3.

Certain groups active in civilian defense must be familiar with the special technics of sampling and identification of chemical warfare agents, and the decontamination of areas and materials polluted by gas, including foods. For them the author brings together here the best of the available data on poison gases, smokes and other chemical agents, in such form that the book can be used as a study text and as a reference manual.

The book is intended for defense personnel who already have some knowledge of chemistry and of laboratory procedures, such as gas identification and decontamination officers, and for health officers and war gas chemists. The author states that parts of it should also be useful to air raid wardens and other civilian defense groups, but the very fact that the treatment is sufficiently detailed to be valuable to trained technicians makes it doubtful if it would do other than confuse non-technical readers.

Food protection and food decontamination are discussed. It is interesting that the packaging materials which are most satisfactory from the standpoint of preserving food quality are also satisfactory against poison gases, vapor or liquid. Hermetically sealed metal drums, casks and cans, glass bottles or jars with impervious plastic or metal caps, and heavy liquid-tight wooden barrels are said to give complete protection. Well-sealed cellulose wrappings are good, and other packaging materials may be satisfactory if tightly sealed. Precautions for the protection of large quantities of food stored in warehouses include suitable placement in the building, careful stacking and the use of covers or screens against spray. Methods are given for determining whether foods which have become contaminated can be salvaged, and the necessary steps in salvaging are outlined. Sampling under field conditions requires special apparatus and gas protective clothing, which are described.

Trade Law Handbook

FEDERAL TRADE LAW AND PRACTICE. By Henry Ward Beer. Published by Baker, Voorhis & Co., Inc., 30 Broad St., New York, N. Y. 1942. 999 pages; 6¼x9¾ in.; cloth. Price, $15.

Attorneys for food companies who have occasion to appear before the Federal Trade Commission, or before federal courts in FTC cases, will find this book of practical assistance. The author clarifies each phase of the procedure in a Commission case so that respondents may know how to protect their rights, and he also discusses the extra-judicial procedure of the Commission in holding trade practice conferences.

Much attention is given in the book to cease and desist orders and to proof of false, fraudulent and misleading advertising.

In addition to an extensive index which facilitates finding information pertaining to a certain subject, there are tables of court cases and of FTC complaints and orders.

1. Buy War Bonds.
2. Produce all war essentials with utmost speed.
3. Protect all perishable foods in process, in storage, in shipment—with dependable JAMISON-BUILT DOORS.

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JAMISON COLD STORAGE DOOR CO.
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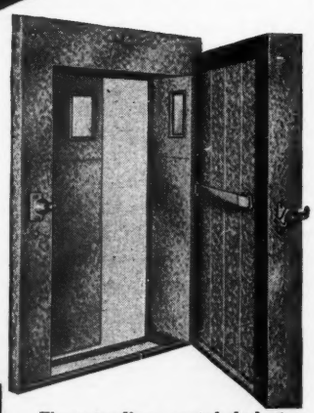


Fire-retarding, metal-clad Super-Freezer Vestibule Door. Send for Bulletin 126. A typical example of how JAMISON creates doors to meet all needs.

PATENTS

Sugars and Sugar Alcohols, Sugar and Sugar-derivative Aliphatic Acid Esters, and Glycerol Emulsified in Water to Form an Organic Water Repellant—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. No. 2,285,422. June 9, 1942.

Yeast Propagated in Wort Containing Synthetic Vitamin B_1 to Increase Its B_1 Potency—Alfred S. Schultz and Lawrence Atkin, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,285,465. June 9, 1942.

Plastic, Edible, Unmelted Fat Intimately Mixed With 3 to 15 Percent Egg Yolk For Use as Ingredient in Bakery and Confectionery Products Containing Sugar, Fats and Large Proportion of Moisture—John R. White, Belmont, and Joseph Avery Dunn, Newtonville, Mass., to Lever Brothers Co. No. 2,285,478. June 9, 1942.

Liquid Density Maintained Under Automatic Control—Charles E. Kerr, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,285,586. June 9, 1942.

Egg Albumen, Casein and Blood Fibrin Subjected to Combined Peptic and Tryptic Digestion Preparatory to Addition of 0.00001 to 0.015 Percent Boric Acid For Use as Bacterial Culture Medium—John H. Glynn, to Armour and Co., Chicago, Ill. No. 2,285,708. June 9, 1942.

Frankfurter Sausages Made on Straight-Line Production Basis—Harry H. McKee, Henry W. Metzen, and Edward A. Schiewe, to Industrial Patents Corp., Chicago, Ill. No. 2,285,736. June 9, 1942.

Fruit Treated in Closed Chamber Having Air Inlet and Outlet Located so as to Direct Incoming Air Over and Downwardly Through Fruit on Conveyor—Jagan N. Sharma, Los Angeles, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,285,841. June 9, 1942.

Bacon Skinned by Mechanical Means—Adrian C. Van Hooydonk, to John E. Smith's Sons Co., Buffalo, N. Y. No. 2,285,951. June 9, 1942.

Wet or Slippery Smooth-surfaced Fruit Graded According to Size by Mechanical Means—Edwin M. Wayland, Covesville, Va. No. 2,285,955. June 9, 1942.

Carcasses Suspended by Each Hind Leg and Mechanically Spreaded in Direction of Travel During Movement Along an Overhead Trolley Conveyor—Harry L. Murphy, La Grange, Ill., to Armour and Co., Chicago, Ill. No. 2,285,999. June 9, 1942.

Doughnuts Turned While Frying With Aid of Rotor Having Spaced Blades—Ernest J. Roth, Norwood, N. J., to Joe Lowe Corp., New York, N. Y. No. 2,286,013. June 9, 1942.

Natural Casings in Fresh Condition Inspected and Tested by Mechanical Means—Frank G. Leavenworth, Elmhurst, Ill., to Packers Machinery Co., Chicago, Ill. No. 2,286,172. June 9, 1942.

Fresh Fruits Quick Frozen in Loose Formation Through Use of Sugar Solution Refrigerant—Harry A. Noyes, Waban, Mass., to Z Pack Corp., Jersey City, N. J. No. 2,286,225. June 16, 1942.

Corn Ears Mechanically Straightened for Passage Through Husker—Benjamin M. Hyman, Moline, Ill., and Rector C. Fergason, La Porte, Ind., to International Harvester Co. No. 2,286,279. June 16, 1942.

Ground Roasted Coffee Extracted With Ethylene Oxide to Make Coffee Concentrate—Robert Louis Brandt, to Coffee Products Corp., New York, N. Y. No. 2,286,334. June 16, 1942.

Foods Cooled During Passage on Spray-cooled Conveyor While in Contact With Separate Flexible Cover Belt Which Closely Conforms to Shape of Units Treated and Upon Which is Sprayed Cooling Medium—Harry Y. Stebbins, Los Angeles, Calif. No. 2,286,514. June 16, 1942.

Sliced Raw Potatoes Mechanically Held in Flat Position During Passage Through Cooking Bath—Mark Pringle, Amsterdam, and Herman F. Lame, Albany, N. Y.; one-third to George A. Brace. No. 2,286,644. June 16, 1942.

Fruit Mechanically Pared While Rotating About Horizontal Axis — Harrison W. Rogers, Miami, Fla. No. 2,286,648, and 2,286,649. June 16, 1942.

Poultry Plucked Mechanically—Otis Sandlin, to Whistler's Picking Machine Co., Philadelphia, Pa. No. 2,286,650. June 16, 1942.

Vegetables and Fruits, Particularly Whole Potatoes, Washed and Heat Dried to Prevent Deterioration During Shipment—Alexander F. Arthur, Homestead, Fla., to Frederick C. Peters, Miami Beach, Fla. No. 2,286,705. June 16, 1942.

Chewing Gum Base Made From Polymerized Rosin and Polyhydric Alcohol Esters—Joseph N. Borglin, to Hercules Powder Co., Wilmington, Del. No. 2,286,712. June 16, 1942.

Egg Meats Freed From Foreign Matter and Fibrous Tissue by Mechanical Agitation and Filtering—Frank B. Lomax, Chicago, Ill. No. 2,286,746. June 16, 1942.

Bread Dough Subjected to Automatically Applied and Time-controlled Predetermined Pressure During Mechanical Shaping Into Rounded Portions—Robert J. Beutel, Brooklyn, N. Y., to American Machine & Foundry Co. No. 2,286,983. June 16, 1942.

Peeled Pineapple Subjected to Vacuum to Draw Vapor of Juice to Surface for Improvement of External Appearance—Lucian Norwood Jones, Richmond, Va., to The Girdler Corp., Louisville, Ky. No. 2,286,998. July 16, 1942.

Foods, Including Liquids, Subjected to Deaerating Operation, Delivered to Container for Packaging, and Subjected to Subatmospheric Pressure With Formation of Vapor of Liquid Contents to Sweep Air Out of Container Head Space Preparatory to Sealing—Horace L. Smith, Jr., Richmond, Va., to The Girdler Corp., Louisville, Ky. No. 2,286,999. June 16, 1942.

Vegetables Blanched in Continuous Manner While Carried Through Drum Divided Into Pockets by Baffles and End Disks With Openings Through Which Current of Water Flows Carrying Scalded Vegetables Away From Drum—Edwin Allan, Spencerport, N. Y. No. 2,287,014. June 23, 1942.

Shell Eggs Cleaned by Rubbing With Absorbent Surface Wetted With Water Solution of Fruit Acid and Ethyl Alcohol—Ralph Webb Schofield, Vashon, Wash. No. 2,287,141. June 23, 1942.

Doughnut Cooking Fat Automatically Maintained at Desired Level in Cooking Kettle—Ernest J. Roth, Norwood, N. J., to Joe Lowe Corp., New York, N. Y. No. 2,287,396. June 23, 1942.

Fruits and Vegetables Dry Cleaned by Action of Mechanically Driven Spiral Brushes—Raymond Peeples, Palisade, Colo. No. 2,287,447. June 23, 1942.

Starch Heated in Dry State in Presence of Monochloracetic Acid and Chlorine Gas for Conversion to Dextrine—August J. Bulfer, Berwyn, and Clark C. Gapen, Oak Park, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,287,599. June 23, 1942.

Corn Gluten Extracted Under Solvent and Temperature Control for Separation of Zein, Oil and Coloring Contents—Lloyd C. Swallen, Pekin, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,287,649. June 23, 1942.

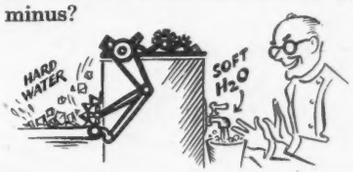
Pineapples Freed From White Spot Defects by Heating Preliminary to Application of Vacuum For Vaporizing of Water Content—Bernard J. Butler, to Maui Pineapple Co., Ltd., Paia, Territory of Hawaii. No. 2,287,668. June 23, 1942.

Cereal Grains Containing Starch Particles Subjected to High Vacuum, Soaked in Water at Raised Temperature to Leech Out Substantial Portion of Nutritive Solubles, and subjected to Fluid Pressure to Force Enriched Solution Into Starch Particles With Subsequent Removal of Grain From Solution For Drying—Eric Gustav Huzenlaub, Brentford, England, one-half to John Heron Rogers, Kinley, England. No. 2,287,737. June 23, 1942.

Confection Made to Contain Dispersed Mix-

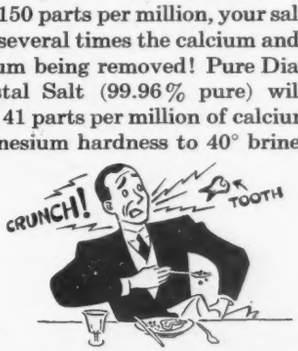
HOW PURE IS "PURE"?

How PURE is "pure" salt? 99.75%? 99.46%? Or, do you need Diamond Crystal—99.96% pure—whose average variation is no more than 0.01%, plus or minus?



First let us ask—have you installed water-softening equipment? If you have, beware of impure salt. For salt impurities—calcium sulphate, calcium chloride, and magnesium chloride—are the same ones that make water hard.

If you calculate the hardness imparted to 40° brine by salt, you will see that 99.75% pure salt adds 267 parts per million of calcium and magnesium hardness. A 99.46% pure salt adds 572 parts per million of hardness. A 99.26% pure salt adds well over 1000 parts per million. If your water softener takes out 100-150 parts per million, your salt may add several times the calcium and magnesium being removed! Pure Diamond Crystal Salt (99.96% pure) will add only 41 parts per million of calcium and magnesium hardness to 40° brine.



Don't forget that calcium and magnesium introduced into your food products must be added to what is in your water supply. For, in processing food products that contain pectin or protein, calcium and magnesium alter their physical properties, developing toughness. Anything that toughens your products is undesirable, for the public judges food products by their tenderness.

If *you* have a salt problem, write our Director of Technical Service! He will be happy to help. Diamond Crystal Salt Co., Inc., St. Clair, Mich.

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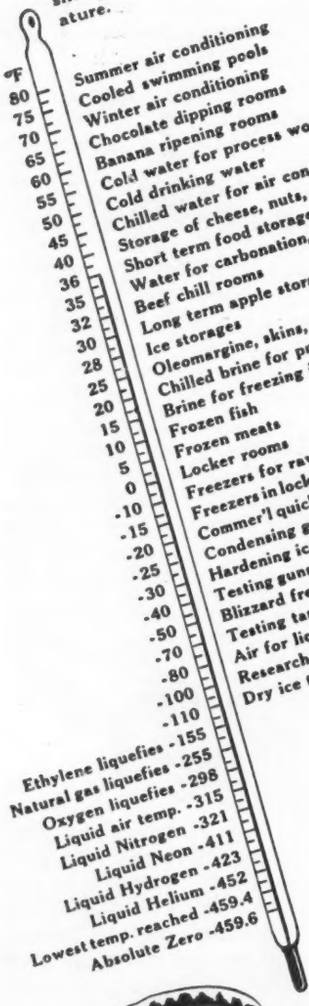

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ture of Phosphatide and Salt Whose Positive Ion Is Hydrophilic and Whose Negative Ion Is Lipophilic as Ingredient—Joseph Stanley, Jackson Heights, N. Y., to American Lecithin Co., Cleveland, Ohio. No. 2,287,838. June 30, 1942.

Vitamin E Substitute Made Synthetically—Lee Irvin Smith and Herbert E. Ungnade, to Regents of University of Minnesota, Minneapolis, Minn. No. 2,287,949. June 30, 1942.

Cocoa Beans Roasted in Continuous Manner—Thomas J. Stephens, New York, N. Y. No. 2,288,045. June 30, 1942.

Chewing Gum Base Made to Contain Tasteless and Odorless Polyvinyl Ester, Plasticizer, Mineral Filler, and Stabilizing Fatty Substance Free From Unpleasant Taste or Odor—George James Manson, Brantford, Ontario, to Shawinigan Chemicals, Ltd., Montreal, Quebec. No. 2,288,100. June 30, 1942.

Yeast-raised, Soda-cracker Sponge Dough Held Within pH Range of 7.0 to 7.5 by Addition of Excess Sodium Bicarbonate Together With Ammonium Salt of Strong Acid—Edwin A. Vaupel, Chicago Heights, Ill., to Victor Chemical Works. No. 2,288,118. June 30, 1942.

Animal Body Fat Mixed With Fat-absorbing Substance Such as Cheese or Peanut Butter and Emulsified With Water to Make Edible Plastic Spread—Stephan L. Komarik, to Griffith Laboratories, Inc., Chicago, Ill. No. 2,288,244. June 30, 1942.

Hydrogenated Edible Oil Added in Small Quantity to Roasted Vegetables Such as Coffee to Improve Flavor and Aroma of Resulting Beverage—John L. Kellogg, to John L. Kellogg & Co., Chicago, Ill. No. 2,288,284. June 30, 1942.

Jerusalem Artichoke Polysaccharides Fermented by Improved Yeast Strains—Leo M. Christensen, Atchison, Kan., to Chemical Foundation, Inc. No. 2,288,314. June 30, 1942.

Animal and Vegetable Crude Oils Treated With Liquefied Normally Gaseous Hydrocarbon to Precipitate Gummy Materials During Refining—Frederick J. Ewing, Pasadena, Calif. No. 2,288,441. June 30, 1942.

Oil-bearing Seeds Heated With Agitation at Rate of at Least 5 B.t.u. Per Lb. of Material Per Min. Preparatory to Recovery of Oil Content—Fred W. Weigel, Knoxville, Tenn., No. 2,288,662. July 7, 1942.

Cheese and Similar Plastic Foods Packaged in Container With Triangular Cross Section and Inner Surface Film That is Heat Sealing—Leo Peters, to Armour and Co., Chicago, Ill. No. 2,288,739. July 7, 1942.

Juice Fruits Cut Into Halves, Then Into Quarters, and Fed Into Extract by Automatic Mechanical Means—Albert R. Thompson, Los Gatos, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,288,756. July 7, 1942.

Piecrust Protected During Handling and Transportation by Mechanical Device With Heat Insulating Lining—Hattie Earl, Tulsa, Okla. No. 2,288,795. July 7, 1942.

Modified Evaporated Milk Made by Combining Sterilized Whole Milk, Milk Whey and Sugar Solution, Followed by Concentrating Under Reduced Pressure at Temperatures Lower Than Those Used for Sterilizing—John T. Meyenberg, Salinas, Calif. No. 2,288,825. July 7, 1942.

Doughs Cut and Shaped by Mechanical Means—Stanley A. Kretchman, Chicago, Ill. No. 2,288,908. July 7, 1942.

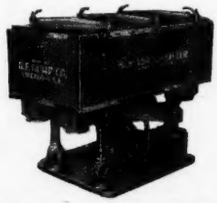
Foods Packaged in Self-heating Container; Heating Mixture Consists of Dry Sodium Monoxide, Inert Extender, and Metal Aluminum—Albert E. Gessler, to Interchemical Corp., New York, N. Y. Nos. 2,289,007 and 2,289,008. July 7, 1942.

Sausages Packaged in Synthetic Tubular Casings Formed From Staple Fibers of Regenerated Cellulose Impregnated With Cellulose Solution and Subsequently Given Regenerated Cellulose Coating — Otto Schnecko, Wiesbaden-Biebrich, Germany, No. 2,289,049. July 7, 1942.

Heat-labile Liquids Concentrated and Dehydrated in Two Stages to Avoid Adverse Effect of Heat Treatment—Joseph M. Hall, Chicago, Ill., to Drying & Concentrating Co. No. 2,289,191. July 7, 1942.

FOR SIFTING Dehydrated

POWDERED OR GRANULAR FOODS



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Cereal Food Made From Whole Grain Heat Treated to Rupture Bran Coat and Gelatinize Starch Content Preliminary to Enzyme Conversion of Starch Into Dextrins and Sugars Followed by Cooking to Inactivate Enzyme, Shaping Into Desired Form and Toasting—Morris S. Fine, Orange, N. J., and Willard L. Roberts, Battle Creek, Mich., to General Foods Corp., New York, N. Y. No. 2,289,416. July 14, 1942.

Fruit and Vegetable Juices Extracted in Atmosphere of Inert Gas; Water Seal is Used on Feed Intake—Roland B. McKinnis, to Sunshine Foods, Inc., Winter Haven, Fla. No. 2,289,445. July 14, 1942.

Cereal Grains Treated to Produce Internal Puffs Without Substantially Deforming Exterior of Kernel—Joseh J. Thompson, Battle Creek, Mich., to Kellog Co. No. 2,289,529. July 14, 1942.

Canadian Patents

Eggs Packed in Cellular Filler Structure Formed From Sheet Scored With Intersecting Lines for Erection Into Cells—Adalbert Krauss, New York, N. Y., to Fred Haller, Bayside, N. Y. No. 405,704. June 23, 1942.

Quick Frozen Vegetables Coated With Sweet, Nonbitter Salt and Sugar Solution, Liquid at Temperature of Frozen Vegetable—Harry A. Noyes, Newton, Mass., to Arthur D. Little, Inc., Cambridge, Mass., and Z Pack Corp., Jersey City, N. J. No. 405,995. July 7, 1942.

Tea Balls Folded Into Bags of Pervious Filter Material Coated on One Side With Layer of Thermosetting, Partially Fused Plastic—Louis Hirschhorn (deceased) to Millie Patent Holding Co., Inc., Long Island City, N. Y. No. 406,081. July 14, 1942.

Foods Frozen in Precooled, Dehumidified Air by Alternate Steps in Which Individual Streams of Air Are Cooled Prior to Contact With Food Product—Wm. J. Finnegan, Hollywood, Calif. No. 406,144. July 21, 1942.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

VITAMINS

Carotene in Vegetables

THE presence of carotene in green, orange and yellow vegetables is not necessarily proof of vitamin A value in the diet. On the basis of the best available research, including recent findings concerning assimilation of carotene in raw and cooked vegetables, the situation may be summed up thus:

In green vegetables vitamin A potency is closely related to carotene content. In yellow and orange vegetables the relation is more remote. Particularly in carrots it may be assumed that not over a sixth of the carotene is assimilable as vitamin A. For this reason the deepest colored carrots are best. Chemical determinations of carotene in food products should always be backed by a biological assay of vitamin A potency before any conclusion is drawn as to nutritional value. A tentative ascending scale of probable vitamin A value is in the order: Cabbage, peas, endive, brussels sprouts, apricots, tomatoes, lettuce, pumpkin, carrots, broccoli leaf, watercress, spinach.

Digest from "Vitamin A Value of Carotene in Vegetables," by H. C. H. Graves, *Chemistry and Industry*, vol. 61, 8, 1942 (Published in England).

DAIRY PRODUCTS

High-temperature Preheat For Evaporated Milk

EVAPORATED whole or skim milk, preheated in 4 seconds to between 214 and 329 deg. F., held 25 seconds, and cooled in 4 seconds, has its heat stability on sterilizing at 239-248 deg. increased from two to six times over milk forewarmed at 203 deg. This increase in stability is greater than can be obtained by stabilizing salts. Skim milk is more stable than whole milk. The limits of temperature permissible for preheating to produce a satisfactory product vary widely between different milks. For some the range is as little as 4 degrees, for others as much as 108 degrees. If preheating overstabilizes, the resulting evaporated milk will be thin bodied; if it understabilizes, the milk will be rough. Homogenizing at 176 deg. slightly increases stability over 122 deg. For general practice of high-temperature preheating, temperatures of 248 to 284 deg. F. are recommended, basing the choice on the results of the previous day's run. The effect of the process on fat separation during storage of the milk has yet to be reported.

Digest from "The Effect of High-Temperature Short-Time Forewarming of Milk upon the Heat Stability of its Evaporated Product," by B. H. Webb and R. B. Bell, *Journal of Dairy Science*, vol. 25, 301-311, April, 1942.

Mold Test For Churning Cream

THE FEDERAL FOOD and Drug Administration has been active in condemning butter containing excessive mold. This has led to extensive use of the Parsons visual mold test for detecting unfit cream. It has value for grading cream as it comes from the farm, but it has only limited use where cream is held a day or two at cream stations at temperatures only ten degrees below atmospheric. Under such holding conditions, quality and grade often decrease and acidity increases, but there is no significant change in mold. A full can with a lid on is not a good medium for mold growth, while bacteria and many yeasts flourish. Testing by odor, flavor and acidity is more satisfactory for determining cream quality at a cream gathering station before shipping to the centralizer.

Digest from "Effect of Holding Cream in the Buying Station upon the Mold Content and Certain Other Quality Factors," by R. W. Morrison, F. E. Nelson and W. H. Martin, *Journal of Dairy Science*, vol. 25, 195-202, March, 1942.

Bacterial Growth in Butter

UNDER commercial conditions butter spoilage due to bacteria occurs rather frequently in spite of various protective factors which, according to studies reported in the literature, should be effective in limiting bacterial growth. Among the influences which tend to restrain the growth of bacteria in butter are fine dispersion of water, low-temperature storage, presence of salt, use of butter culture or acidity, limited air supply and reduction of contamination through purification of wash water. Salt is more effective than any of the special preservatives reported.

The combined action of two or more of these factors would be expected to control bacterial action, but the relatively high incidence of spoilage indicates that certain counterbalancing influences frequently offset them, and that the possibilities of contamination are often overlooked.

The paper includes an extensive bibliography.

Digest from "Factors Influencing Bacterial Growth in Butter," by B. W. Hammer and H. F. Long, *Bacteriological Reviews*, vol. 5, 337, December 1941.

Butter Flavor

DIACETYL and acetylmethylcarbinol, the compounds largely responsible for butter aroma and flavor, come from the culture added to the cream and from the ripening of the cream, and are largely lost in the buttermilk and wash water. What remains is present both in the serum and in the fat of the butter. They are in higher concentration in the serum, acetylmethylcarbinol being higher than the diacetyl. Salting the butter decreases the amount of these substances in the serum, which, however, is still richer in them than is the fat.

Digest from "Distribution of Diacetyl and Acetylmethylcarbinol between Fat and Water, with Special Reference to Butter," by W. H. Hoecker and B. W. Hammer, *Journal of Dairy Science*, vol. 25, 175–185, February, 1942.

BEVERAGES

Fruit Juice Concentrates

PASTEURIZED and sulphited apple, pear, plum, cherry, grape and berry juices can be concentrated by evaporation at 40 to 45 deg. C. in a vacuum evaporator at about 14 mm. pressure. Cider or grape juice which has been clarified only with gelatin may jell during or after evaporation to the usual one-sixth or one-seventh of the initial volume. Grape concentrate from inadequately enzyme-clarified juice may also jell. Mobile liquid concentrates (one-sixth) with excellent keeping quality are obtained from cider, cherry juice, berry juices and white or red low-acid grape juices if the juice has been thoroughly clarified by the enzyme method. Pear juice after gelatin clarification gives a similar concentrate. Frothing and tartar precipitation sometimes interfere with evapo-

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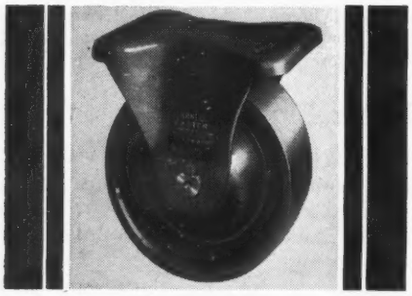
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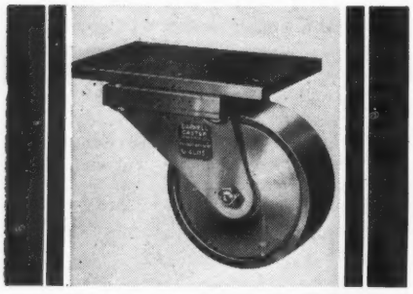
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ration of enzyme-clarified grape juice. Apple and pear juices, if enzyme-treated to complete optical clarity, can be evaporated to one-eighth or one-ninth of the initial volume, yielding fluid concentrates which mix readily with water.

Digest from "Making Concentrates From Pasteurized and Sulphited Fruit, Grape and Berry Juices," A. Widmer and F. Braun, *Landwirtschaftliches Jahrbuch der Schweiz*, vol. 56, 112, 1942 (Published in Switzerland).

Storing Grape Juice

GRAPE JUICE can be stored in closed steel cylinders, holding from 3 to 5 liters, in carbon dioxide generated in the juice itself. The pressure at which liberated carbon dioxide stops the fermentation is from 18 to 24 kg. per sq. cm.

The same result may not be achieved by passing carbon dioxide into the cylinder to the same pressure, because much depends on how completely and uniformly the carbon dioxide is dissolved in the liquid. No definite minimum effective pressure can be stated because there are too many variables. Actual gas pressure, initial yeast cell count, absorption capacity of the juice for carbon dioxide and temperature all have their influence.

Digest from "Scientific Fundamentals of Fruit Juice Storage Under Carbon Dioxide Pressure. Behavior of Yeasts to Carbon Dioxide," by A. Osterwalder and J. Jenny. *Landwirtschaftliches Jahrbuch der Schweiz*, vol. 56, 116, 1942 (Published in Switzerland).

TECHNOLOGY

Hydrogenated Chocolate

HIGH melting point chocolate, melting within the range of 100 to 149 deg. F., can be obtained by hydrogenating in the substantial absence of air and moisture, using a nickel oxide catalyst in pellet form which can be filtered out of the thick product. A temperature above 300 deg. F. affects the flavor unfavorably, and the best results are obtained by hydrogenating between 212 and 300 deg. A pressure of about 2,000 pounds is used. The degree of hydrogenation is controlled by varying the time and temperature. Hydrogenated chocolate can be mixed with untreated chocolate to obtain softening points as desired.

Digest from U. S. reissue patent Re 22,089 (original 2,244,569) issued May 5, 1942, to Frederick H. Penn, Dallas, Tex.

Mixed Sugar Refrigerant

IN quick freezing by the spray method, the use of a sugar refrigerant solution in which levulose comprises at least half of the mixed sugars is covered by a recent patent. The solution is prepared so that it has a concentration not greater than 8 mols and a viscosity of about 70 centipoises in the operating temperature range of 2 to 25 deg. F. It is claimed that this solution rapidly flows over and drains from the surface of fruit or vegetables being frozen, so that there is very rapid conduction of heat away from the food, with no shrinkage or loss of juices, no detrimental physical or chemical alteration, and the product is less subject to dehydration during storage. Methods for preparing suitable refrigerant solutions are described.

Digest from U. S. Patent 2,286,225, issued June 16, 1942, to Harry A. Noyes, Waban, Mass., and assigned to Z Pack Corp.

MEATS

Salt Distribution in Hams

VARIATIONS in the composition of the different ham muscles and their location within the ham influence processing results. Salt distribution is of particular importance in curing and aging, and a knowledge of water distribution is valuable in explaining certain salt movements throughout the meat. In order to obtain information on both these factors, the authors reject sampling methods based on arbitrary measurements which do not take into account the variation in size and shape of the hams, and use instead a method that relates the samples directly to the anatomy of the hams by cutting cross-sectional slices in a predetermined position and then selecting for analysis each muscle segment as it appears in the cross section. Tests on samples so obtained indicated that while there was a similarity of salt content in sound and sour hams, the latter had very poor salt penetration into those muscles where spoilage seemed to be concentrated, in spite of satisfactory salt penetration into other muscles equally distant from the face of the ham.

Digest from "An Improved Method for Determining the Distribution of Salt and Water in Cured Hams," by A. K. Besley and F. Carroll, *Journal of Agricultural Research*, vol. 64, 293, 1942.

Rancidity in Bacon

THE tendency of bacon sides to turn rancid is primarily a characteristic of the particular fat involved. The tendency is only slightly influenced by processing conditions or by the lean meat in the bacon. Variation in sensitivity to rancidity is due partly to irregularities in selection and grading of sides for bacon

and partly to natural differences in the bacon itself. The peroxide oxygen test and the Kreis test are most suitable for judging the rancidity of fat in bacon. A procedure has been developed for preparing bacon fat when physical tests and chemical analyses, including rancidity tests, are to be made.

Digest from "Methods for the Investigation of Rancidity, Their Interrelation and Application to Bacon Fat," by W. Harold White, *Canadian Journal of Research*, vol. 19D, 278, 1941 (Published in Canada).

MISCELLANEOUS

Calcium and Manganese In Maple Sirup

WHEN maple sirup is evaporated its calcium and manganese salts reach the limit of their solubility and form precipitates. Thus a sirup concentrated to 67 percent total solids has only half as much dissolved calcium as the same sirup with 63 percent solids. When the sirup is boiled down in aluminum evaporators at least three-fourths of the manganese is also precipitated. The mineral content of the maple sap varies considerably from season to season and even during the same season. The effect of evaporating the sirup is illustrated by the table, which shows results with sirups from the Experimental Station at Plessisville, Quebec, processed in aluminum apparatus, and two commercial samples (M and N), processed in tinplate. Calcium and manganese are expressed as parts per million of total solids.

Sample No.	Solids (percent)	Calcium (as CaO) p.p.m.	Manganese (p.p.m.)
126.....	63.3	5,020	4.3
110.....	62.3	.....	1.0
108.....	63.8	5,300	3.5
115.....	65.9	4,000	....
119.....	67.0	2,210	....
112.....	67.0	1,850	1.5
123.....	67.2	1,960	4.0
M.....	66.0	1,150	70.0
N.....	67.2	1,180	63.0

Digest from "Calcium and Manganese in Maple Sap and Sirup," by Elphege Bois, Louis C. Dugal and Maurice Lessard, *Canadian Journal of Research*, vol. 20B, 1, 1942 (Published in Canada).

Apple Storage

JONATHAN APPLES were stored under experimental conditions, at 32 and at 36 deg. F. in controlled atmospheres with relatively high carbon dioxide content derived from the fruit itself. The marketable storage period was lengthened and Jonathan spot was controlled. The fruit was firmer, greener in ground color, brighter in red tints, and better in flavor and quality than air-stored apples. At a storage temperature of 35 to 36 deg. F. a carbon dioxide concentration of 3 to 4 percent prolonged storage life

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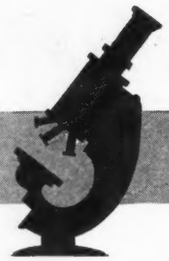

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by 2 to 3 months. The carbon dioxide enriched atmosphere did not increase the tendency to apple scald, but there was some occurrence of brown heart and soggy breakdown in the tests at 32 deg. F. The experiments included carbon dioxide concentrations up to 11 percent.

Digest from "Controlled Atmosphere Storage for Jonathan Apples as Effected by Restricted Ventilation," *Refrigerating Engineering*, vol. 30, 215, 1942.

Levulose from Farm Crops

CHICORY, dahlia and Jerusalem artichoke are the chief levulose-bearing plants which can be cultivated and utilized successfully. Some artichoke varieties are rich in levulose, and the root yield per acre is large. The plant is adaptable to many soils, but large scale harvesting and handling are difficult, and storage conditions must be closely controlled. Dahlias give a lower root yield per acre but are easier to harvest and handle. The plant is sensitive to heat and drought, and gives commercially profitable levulose yields only under optimum conditions. Chicory is easily propagated and harvested, gives a high tuber yield and is fairly rich in levulose. It requires more labor for cultivation than the other plants, but less for harvesting and for storing the propagating material. Levulose yields were determined in numerous samples.

Digest from "Levulose From Chicory, Dahlias and Artichokes," by E. S. Haber, W. G. Gaessler and R. M. Hixon, *Iowa State College Journal of Science*, vol. 16, 291, 1942.

FERMENTATION

Glycerin Production

A MUCH higher yield of glycerin, of a purity suitable for technical uses such as the manufacture of explosives, is obtained by fermenting a mash containing a fermentable carbohydrate such as blackstrap molasses and sodium sulphite, subjecting the fermented mash to vacuum distillation at temperatures below 130 deg. F. to remove the alcohol formed during fermentation, then adding fresh fermentable material to the residue and refermenting it. The vacuum distillation must be conducted in such a way as to remove the alcohol without distilling off any substantial amount of the aldehydes present, since the presence of acetaldehyde in the fermented mash improves the ultimate yield of glycerin.

Digest from U. S. patent 2,275,639, issued March 10, 1942, to N. M. Mnookin, Kansas City, Mo., and assigned to Speas Development Co.

Brief Summaries Of AMS Standards

(Continued from page 62)

one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade which is indicated by the average total score for the product.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug, and Cosmetic Act.

ISSUED: May 11, 1942
EFFECTIVE: June 1, 1942

Canned Pears

THE standards of identity, fill of container and quality for canned pears promulgated under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, are hereby adopted for the purpose of these grades. Canned pears may be halved, quartered, sliced, diced, and whole.

U. S. GRADE A or U. S. FANCY canned pears are units of well-ripened pears of similar varietal characteristics; possess a good, characteristic, practically uniform color; are practically uniform in size and symmetry; are practically free from defects; possess a tender, fleshy texture; possess a normal flavor; and score not less than 90 points when scored according to the scoring system.

U. S. GRADE B or U. S. CHOICE canned pears are units of well-ripened pears of similar varietal characteristics, possess a reasonably good characteristic color, are reasonably uniform in size and symmetry, are reasonably free from defects, possess a reasonably tender texture, possess a normal flavor and score not less than 75 points.

U. S. GRADE C or U. S. STANDARD canned pears are units of pears of similar varietal characteristics; possess a fairly good color; are fairly uniform in size and symmetry; are fairly free from defects; may possess a variable texture but are not objectionably firm or mushy; possess a normal flavor; and score not less than 60 points.

U. S. GRADE D (Seconds) canned pears may be noticeably variable in color but not definitely off color; may be noticeably variable in size and symmetry; are fairly free from peel, core, stems and pathological defects; may be soft, prominently grainy, or firm but not so firm as to be inedible; and possess a normal flavor. Pears of this grade are normally packed in "water, slightly sweetened."

U. S. GRADE E (Water Grade) canned pears are pears that meet the requirements of U. S. GRADE D (Seconds) except that they are packed in water.

Canned pears that fall below the Standard of Quality promulgated under the Federal Food, Drug and Cosmetic Act shall be certified with the additional statement, "Below Standard in Quality," together with the reason for so certifying.

U. S. GRADE F (Solid-Pack Pie) canned pears are pears packed without added water or sirup; may be noticeably variable in size and symmetry; are fairly free from peel, core, stems, and pathological defects; may be soft, prominently grainy, or firm but not so firm as to be inedible; and possess a normal flavor.

OFF-GRADE canned pears are pears that fail to meet the requirements of the foregoing grades.

U. S. GRADES A, B, C and D of canned pears are usually packed in sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product since sirup, as such, is not a factor of grade for the purpose of these grades.

Canned pears will be certified as to grade without regard to sirup density, but in each instance Federal inspection certificates will bear a notation in connection with the grade statement indicating the density of sirup *found upon examination*. For this purpose, "extra heavy sirup" means that the sirup tests 22-deg. or more, but not more than 35 deg., Brix; "heavy sirup" means that the sirup tests 18 to 22 deg.; "light sirup," 14 to 18 deg.; "water, slightly sweetened" less than 14 deg.; and "water pack" means that the product is packed in water.

The container shall be filled with pears as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container. The recommended minimum drained weights in the cans commonly used in packing canned pears are shown in a table in the standards. Cans of pears that meet the recommended minimum drained weight requirements but have not been packed as full as possible without impairment of quality will be certified "Below Standard in Fill."

When certifying samples which have been officially drawn from lots of canned pears, compliance of the entire sample with recommended minimum drained weights will be determined by averaging the drained weights of all containers in the sample, provided the range of variability is within the limits of good packing practice. If the average thus obtained is not less than the recommended drained weights shown in the table in the standards, the samples will be certified without exception.

Except as provided above, canned pears that fall below the recommended minimum drained weight will be certified with the additional statement, "Below recommended minimum drained weight."

Official inspection certificates will indicate the range of count of halves, quarters or whole pears found upon examination.

The grade of canned pears may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (20 points), uniformity of size and symmetry (15 points), absence of defects (30 points) and character of fruit (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

Under the factor of color, the color typical of the variety is considered, as is the uniformity of the color. The factor of color shall not be scored in grading spiced pears, but the color shall be normal for this type of product. The other three factors shall be scored, and the total shall be multiplied by 100 and divided by 80, dropping any fractions.

"Smooth backs and edges" refer to halves that retain their original contour although slight knife marks may be evident.

"Normal shape" means that the halves retain their original conformation although there is evidence of trimming. Halves with holes through the unit or halves that possess deep gouges in the back or sides are not of normal shape.

"Blemished units" are units that are blemished with scab, hail injury, discoloration or other abnormality covering an aggregate area exceeding the area of a circle ¼ in. in diameter. Units with black or very dark spots, worm holes, or serious insect damage are considered blemished units, regardless of the area of the injury.

"Crushed or broken units" are units that have been crushed or broken to the extent that they have lost their normal shape. Pear halves that are slightly split from the edge to the core cavity or at the stem end are not considered broken unless the units are not of normal shape.

"Normal flavor" means that the product is free from objectionable or off flavors of all kinds.

When certifying samples which have been officially drawn and which represent a specific lot of canned pears, the

grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug and Cosmetic Act.

ISSUED: March 10, 1941
EFFECTIVE: April 15, 1942

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Letters to the Editor

Construction Code Should be 21.10

To the Editor
of FOOD INDUSTRIES:

The article in the August issue by W. B. Spooner, Jr., discussing Priorities Regulation No. 10, is an excellent one.

In the third column on page 40 there appears an error which I feel sure is due to a transposition of figures. Reference is made to the Code to be used for construction, signifying "use of the code 20.10." As the author probably very well knows, the correct classification symbol should be 21.10 for the construction of new buildings.—A. H. SAUL, *Beech-Nut Packing Co., Canajoharie, N. Y.*

As reported elsewhere in this issue, Priorities Regulation No. 10, the vehicle of the allocation classification system, is being revised by the government.—THE EDITORS.

Ban on Monochloracetic Acid Held Wise

To the Editor
of FOOD INDUSTRIES:

We have noted with much interest the letter from Prof. C. D. Leake which you have published under the title, "Monochloracetic Acid Ban Held Ridiculous," in the June, 1942, issue of FOOD INDUSTRIES. This ban, far from being ridiculous, is in our opinion well taken at this time. Prof. Leake is much better qualified than we are to discuss the toxicology of monochloracetic acid, although Woodward and his collaborators of the F.D.A. obtained results that differ in degree from those obtained by him. There apparently is no doubt that monochloracetic acid is toxic, although there is some question as to its toxicity on repeated oral administration of sublethal single doses. Prof. Leake believes that in concentrations of 300 p.p.m., considered by him to be the optimum for stabilization in good commercial practice,* there is no hazard to health.

We do not believe that the evidence available at present justifies his contention that monochloracetic acid is superior to benzoic acid and is useful "in a variety of circumstances where nothing else is available to accomplish the desired stabilization." In the only comparative study of the preservative value of monochloracetic acid yet published** (unfortunately limited only to apple juice), it has been clearly demonstrated that the preserving action of monochloracetic acid under practical conditions was substantially the same as that of benzoic acid; if anything benzoic acid was the better preservative. Early unpublished observations made by us confirm this conclusion. Samples of orange juice and apple juice containing 0.1 percent monochloracetic acid when stored in an open flask were found to mold and sour after storage for several days, while samples containing 0.1 percent sodium benzoate did not mold until after storage for a week or so longer.

It has been claimed that monochloracetic acid is a stabilizer and antioxidant as well as anti-fermentative agent. This we have not been able to confirm. Monochloracetic acid (in concentrations as high as 0.2 percent) will not inhibit the activity of pectic enzymes either in apple or in orange juice; i.e., it will not prevent the clearing and clotting that occurs; it will also, unlike sulphurous acid, not prevent the oxidative discoloration and browning in these juices. Neither will monochloracetic acid stabilize the anthocyanin pigments in red wine.

It is our experience that the use of monochloracetic acid is not essential in the production of commercial fruit and

* Apparently based on the claims made in U. S. Patent No. 2,157,632 and 2,157,633, May 9, 1930, issued to A. Shapiro.

** F. W. Fabian and E. F. Bloom. The Chloracetic Acids as Preservatives for Apple Juice, *Fruit Products Journal, vol. 21,* 292–296, 1942.

vegetable products since these can be well preserved by existing methods (as indeed they have during the many years before monochloracetic acid was introduced!). Where chemical preservatives are required, sulphurous acid and benzoic acid alone or in combination are satisfactory. We do not wish to imply, however, that these chemical preservatives are entirely satisfactory. We believe that there is a need for a preservative combining low toxicity to humans with high toxicity to microorganisms and enzymes and really possessing antioxidative properties. Monochloracetic acid is not this ideal preservative.

Furthermore, monochloracetic acid was and is still being introduced under unsavory circumstances. We first encountered it as "505," advertised as a fermentation and oxidation inhibitor which could be used freely in foods without declaration, as "government chemists could not detect its presence." Even now that we and others have shown that it can be detected, its advocates believe that the stigma attached to the declaration of the presence of sodium benzoate will not apply to the declaration of added monochloracetic preparations sold under various trade names or even as monochloracetic acid itself (although many consumers would balk at eating food preserved with corn remover!). In view of this attitude and particularly because of the need of further work both on the toxicology, alleged antioxidative activity, and preservative value of monochloracetic acid, we believe the F.D.A. ruling to be wise.—M. A. Joslyn and W. V. Cruess, *University of California, Berkeley, Calif.*

Erratum

To the Editor
of Food Industries:

In reviewing the article on "Facts about Caffeine, Theobromine in Foods," by P. W. Punnett, on page 52 of March, 1942, Food Industries, it is noted that the Power-Chestnut method was used in the determination of caffeine.

This method has been adopted as official by this Association, and this fact has been given recognition in the article. However, the citation giving McGraw-Hill as publishers of the 5th edition of the "A.O.A.C. Methods of Analysis" in the No. 1 reference on page 96 is in error.—Henry A. Lepper, *Editor. Journal of the Association of Official Agricultural Chemists, Washington, D. C.*

("*Methods of Analysis of the Association of Official Agricultural Chemists*" *is published by the A.O.A.C.*—The Editors.)

PROTECTING PERISHABLES

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FORMULAS FOR FOODS

FORMULA NO. 341

Soft Drop-Cake Cookies

Shortening (part butter)	3 lb.
Flour	2½ lb.
Milk (solids basis)	½ lb.
Salt	1½ oz.
Soda	4¾ oz.
Cinnamon	¾ oz.
Ginger	⅜ oz.
Allspice	⅜ oz.
Mixed dried fruit	3½ lb.
Water	4½ lb.
Egg yolk	¾ lb.
Molasses, good flavor	7½ lb.
Standardized invert sugar	½ lb.
Whole-wheat flour	7½ lb.

Directions

Cream shortening, flour, milk, salt, soda and spices. Grind dried fruit, which may be:

Raisins	2 lb.
Apricots	½ lb.
Figs	½ lb.
Prunes	½ lb.

Add this to first mixture and cream until light.

Dissolve the egg yolk, molasses and invert sugar in the water and add along with the whole-wheat flour. Mix until smooth, but still light. Do not overmix.

Drop by hand or machine on greased pans and bake at about 375 deg. F. Cookies should be soft and cake-like when done.

The spices suggested can be varied to suit market requirements. The amount of allspice should be increased if cinnamon is not available, also prepared mixed cake spice can be used in equal weight for the spices given here.

Formula from American Molasses Co.

FORMULA NO. 342

Potato Doughnuts

Potato flour	1 lb.
Shortening	1 lb.
Salt	3 oz.
Sugar	1 lb.
Vanilla flavoring	¼ oz.
Lemon extract	To taste
Nutmeg	To taste
Eggs	4
Cake flour	4 lb.
Bread flour	4 lb.
Baking powder	2 oz.
Milk, skim or whole	3 qt.
Yeast	6 oz.

Directions

First cream together the potato flour and shortening. Add sugar, salt, flavorings and eggs. Flavorings should be used sparingly, particularly the lemon extract.

Add the milk in which the yeast has been dissolved, and finally the flour sifted together with the baking powder. Mix into a smooth dough.

The temperature of the dough when mixed should be 82 to 84 deg. F. Let the dough rest 30 minutes, then cut into doughnuts. Fry at 360 deg. F.

This quantity makes about 20 dozen doughnuts.

Formula from Rogers Bros. Food Products.

FORMULA NO. 343

Almond Brittle Topping

Shortening	1 lb.
Honey	1 lb.
Almonds	1 lb.
Sugar	1 lb. 4 oz.
Salt	¼ oz.
Cinnamon	⅛ oz.

Directions

Place all ingredients in a copper kettle over a low flame and stir constantly until mix reaches 180 deg. F. Cool to approximately 110 deg. F. Spread on sweet rolls or coffee cake before baking.

Since it is very important that the brittle be warm enough to handle, keep in a hot-water bath while using. Left-over brittle can be recooked with a new batch.

Formula from General Mills, Inc.

FORMULA NO. 344

Tongue and Cheese Loaf

Pickled pork or lamb tongues (cut into 1-in. cubes)	40 lb.
Hog skins	20 lb.
Backfat (cut into ½-in. cubes)	40 lb.
Swiss cheese* (cut into ½-in. cubes)	10 lb.
Dry milk solids not over 1¼% fat	10 lb.
Salt	2½ lb.
Pepper	7 oz.
Onion powder	2 oz.
Sweet marjoram	2 oz.
Ground cloves	1 oz.

*A cheese that does not melt or run at the temperature required for processing must be used. Use of cheese made specially for this purpose is recommended.

Directions

Cook tongues and hog skins until tender. Peel tongues and cut into about 1-in. cubes. Grind hog skins through ⅛-in. plate. Cook backfat about 1 hour at almost boiling temperature, then cut into ½-in. cubes. Cook all ingredients in same water. Use just enough water to cover well.

When everything is ready, place tongues and hog skins in mixer, add about 20 to 25 lb. of meat broth, sprinkle in dry milk solids, backfat, cheese and spices, and mix well. Place in parchment-lined pans, put on lid and cook for 2 hours at 160 to 165 deg. F.

Chill overnight and stuff in cellulose casings.

EDITOR'S NOTE: *White pepper is recommended in this formula, and if black pepper is used the quantity may need to be reduced somewhat, depending on taste.*

Formula from American Dry Milk Institute.

FORMULA NO. 345

Home Type Lemon Pie

Water	3 lb. 8 oz.
Sugar	2 lb. 4 oz.
Shortening	4 oz.
Cornstarch	6 oz.
Powdered lemon juice	3½ oz.
Salt	¼ oz.
Water	8 oz.
Egg yolk	7 oz.

Cooking Directions

Bring the water, sugar and butter to a brisk boil. Mix cornstarch, powdered lemon juice and salt together dry and then make into a smooth cream by adding the egg yolk and water (8 oz.). Pour this cream slowly into the boiling sirup while stirring. Continue to cook until filler thickens.

Fill into baked shells while hot. When partly cooled, spread with egg white meringue, dust with powdered sugar and brown in a medium oven.

Formula from The Borden Co.

FORMULA NO. 346

Army Basic Sweet Dough

Sugar	2 lb. 4 oz.
Salt	3 oz.
Malt	8 oz.
Shortening	2 lb. 8 oz.
Mace	¼ oz.
Eggs	2 lb.
Lemon extract	¼ tsp.
Water or milk	8 lb. 5 oz.
Flour, bread	13 lb.
Yeast	1 lb.
Flour, pastry	4 lb.

Mixing Directions

Cream or mix the sugar, salt, shortening, mace and malt, add the eggs gradually and mix in, then the lemon extract. Dissolve the yeast in one-fourth of the liquid to be used in the

dough and set aside temporarily. Add the remainder of the liquid to the first mixture and continue mixing until a soft batter is obtained.

Add the 13-lb. of bread flour and continue mixing until thoroughly incorporated, then add the yeast solution. Add the pastry flour and mix only sufficiently to thoroughly incorporate flour and yeast solution.

Fermentation

When accurate temperature control is not available, effort should be made, by tempering the liquid content of the dough, to secure a mixed dough temperature of about 78 deg. F. in summer and 82 deg. F. in cold weather. When the weather is extremely warm or bench work takes more than one hour, the salt content should be slightly increased. The dough will appear quite slack when mixed, but will stiffen during fermentation.

Allow 1½ to 2 hours for fermentation, at 80 deg. F., if the dough can be scaled and made up within one-half hour, but allow only ¾ to 1 hour for fermentation if the bench work must take longer, from 1¼ to 1¾ hours.

Make up as desired, allowing dough to intermediate proof on work bench 15 to 20 minutes, place in baking pans and proof at 85 or 90 deg. F. for from 35 to 50 minutes. Bake in an oven at 425 to 450 deg. F. for about 15 minutes.

Making Up

The variety of products that may be made from the basic sweet dough depends on the ingenuity of the baker in concocting new shapes and his ability to incorporate additional flavors, ingredients, etc., to enhance flavor and attractiveness. Varieties that are easily made include cinnamon buns, butterfly buns and coffee cake with a butter or streusel topping.

Formula from "Army Baker," Quartermasters Corps Training Manual No. 2100–151.

FORMULA NO. 347

Devil's Food Cup Cakes

Cake flour	5 lb.
Cocoa (natural)	1 lb. 8 oz.
Salt	2½ oz.
Baking powder	3 oz.
Soda	1¼ oz.
Emulsifying shortening	2 lb. 8 oz.
Sugar, fine granulated	7 lb.
Milk, liquid	4 lb. 4 oz.
Vanilla	1 oz.
Whole eggs	2 lb. 12 oz.
Milk, liquid	3 lb.

Mixing Directions

Start mixing the dry ingredients—flour, cocoa, salt, baking powder, soda—at low speed. Add 4 lb. 4 oz. of milk and flavoring and continue to mix until smooth for a total mixing time of 5 minutes. Mix eggs with 3 lb. of milk and add in three portions over a 2-minute period at low speed. Stop machine and scrape bowl well, then continue mixing for 5 minutes at low speed. Temperature of the finished batter should be 70 to 75 deg. F.

Scale 16 oz. for a dozen cup cakes, so that this quantity will make approximately 26 dozen cup cakes. Bake at 375 to 390 deg. F. Remove from pans while warm. This can also be baked as a standard loaf or 8-in. layer, scaling 12 oz.

Formula is balanced for natural cocoa, so if Dutch cocoa is used the soda should be reduced to ½ oz. and the baking powder increased to 4 oz.

Formula from Lever Bros. Co.

Fruit Purees For Ribbon Ice Cream

On page 49 of this issue of Food Industries there is an article giving complete directions for making many flavors of fresh fruit purées to be used in ribbon ice cream.

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